NAS 1.17:13/20

VOLUME 13/NUMBER 20
OCTOBER 23, 1975
ACC. NOS. N75-29001 TO N75-29995

NOV 25 1975

STAR
AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

RECEIVED
MIAMI UNIVERSITY
LIBRARIES
NOV 20 1975
DOCUMENTS DEPARTMENT

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
OFFICE

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or ERDA through the usual contract- or grant-reporting channels), please send them to NASA, Scientific and Technical Information Office/KSI, Washington, D.C. 20546, for consideration.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed nor sold.

PURCHASE OF *STAR*

The semimonthly issues and the cumulative index issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C., 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $66.90 domestic; $83.65 foreign. Price per single copy: $2.80 domestic; $3.50 foreign.

Cumulative index issues...

Annual subscription rates: $28.10 domestic; $35.15 foreign. Price per single copy varies according to number of pages.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION OFFICE
Scientific and Technical Aerospace Reports, Volume 13, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by Informatics Information Systems Company.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through June 30, 1977.

INTRODUCTION

Scientific and Technical Aerospace Reports (*STAR*) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA FEDD (For Early Domestic Dissemination) documents
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published semiannually and annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 750 Third Avenue, New York, N. Y. 10017.

ON-GOING RESEARCH PROJECTS

By arrangement between NASA and the Smithsonian Science Information Exchange (SSIE), a separate section of information on aerospace-related *On-Going Research Projects* is inserted into each issue of *STAR*. The insert presents titles of active NASA grants and university contracts, summary portions of recently updated *NASA Research and Technology Operating Plans (RTOPs)*, and notices of non-NASA research projects that were funded in the most recent or current fiscal year. The latter are selected by SSIE. The project announcements in the insert are arranged by *STAR* divisions but are otherwise entirely separate from *STAR*. They are not indexed nor machine-searchable by NASA. Current and retrospective searches are available from SSIE, 1730 M Street, N.W., Washington, D.C. 20036.

Subject scope of *STAR*, *IAA*, and *On-Going Research Projects* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

Other NASA publications and information services are described in a booklet, *The NASA Scientific and Technical Information System . . . and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

CATEGORIES AND CROSS-REFERENCES

STAR is categorized by 10 major subdivisions divided into 74 specific subject categories and one general category/division. These are presented in the Table of Contents. Documents announced in *STAR* are not ordinarily cross-referenced between categories, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service to U.S. customers at the price shown in the citation following the letters HC (hard, paper, or facsimile copy). Customers outside the U.S. should add $2.50 per copy for handling and postage charges to the price shown. (Prices shown in earlier *STAR* volumes, 1962-1974, have been superseded but may be calculated from the number of pages shown in the citation. The price schedule by page count was given in the last *STAR* issue of 1974 or may be obtained from NTIS.)

Microfiche[1] is available at a standard price of $2.25 (plus $1.50 for non-U.S. customers) regardless of age for those accessions followed by a "#" symbol. Accession numbers followed by a "+" sign are not available as microfiche because of size or reproducibility.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Unit.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the "*" symbol), use the N accession number.

NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number.

Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $2.25 price, for those documents identified by a "#" symbol.)

(1) A microfiche is a transparent sheet of film, 105 by 148mm in size containing as many as 60 to 98 pages of information reduced to micro images (Not to exceed 28. 1 reduction).

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: ERDA Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Energy Research and Development Administration reports, usually in microfiche form, are listed in *Nuclear Science Abstracts*. Services available from the ERDA and its depositories are described in a booklet, *Science Information Available from the Energy Research and Development Administration* (TID-4550), which may be obtained without charge from the ERDA Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) at $10.00 each and microfilm at $4.00 each regardless of the length of the manuscript. Handling and shipping charges are additional. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: ZLDI. Sold by the Zentralstelle für Luftfahrtdokumentation und -Information, Munich, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent Office. Sold by Commissioner of Patents, U.S. Patent Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

REPORTS AVAILABLE FOR EARLY DOMESTIC DISSEMINATION (FEDD)

NASA has initiated a program under which its technology having significant commercial potential will be disseminated to domestic organizations prior to its general publication. This program implements NASA's mission set forth in the Space Act to preserve the role of the United States as a leader in aeronautical and space science and technology. One of the mechanisms for acquainting domestic organizations with this early-access technology is through publication in *STAR*. The reported technology is identified by the subtitle "An Early Domestic Dissemination Report" in the *STAR* citation, and in addition, is referenced under the entry "Proj. FEDD" in the Contract Number Index. Interested domestic organizations may purchase FEDD reports from any of the following Industrial Applications Centers:

NASA Industrial Applications Center (FEDD)
Indiana University
Poplars Research and Conference Center
Bloomington, Indiana 47401

NASA Industrial Applications Center (FEDD)
P. O. Box 12235
Research Triangle Park (Durham),
North Carolina 27709

NASA Industrial Applications Center (FEDD)
University of Pittsburgh
Pittsburgh, Pennsylvania 15260

NASA Industrial Applications Center (FEDD)
The University of New Mexico
Albuquerque, New Mexico 87106

NASA Industrial Applications Center (FEDD)
The University of Connecticut
Mansfield Professional Park
Box U-41N
Storrs, Connecticut 06268

NASA Industrial Applications Center (FEDD)
University of Southern California
809 West 34th Street
Los Angeles, California 90007

Queries concerning FEDD program matters other than document orders should be addressed to:

Assistant Administrator for Industry Affairs
and Technology Utilization (Code K)
National Aeronautics and Space Administration
Washington, D.C. 20546

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold by the National Technical Information Service at the price shown in the citation. Microfiche are sold at the established unit price of $2.25. The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents
U.S. Patent Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents. Prepaid purchase coupons for ordering are also available from the Patent Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services, in addition to the distribution of NASA scientific and technical reports and of *STAR* and its cumulative indexes, is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
Attn.: Registration Activity
P. O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: Foreign Exchange and Acquisitions Branch.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics
and Astronautics
Technical Information Service
750 Third Ave.
New York, N.Y. 10017

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents
U.S. Patent Office
Washington, D.C. 20231

Energy Research and Development
Administration
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA - Space Documentation Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome), Italy.

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Office (KSI)
Washington, D.C. 20546

National Technical Information Service
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration Bldg.
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

Zentralstelle für Luftfahrtdoku-
mentation und -Information
8 München 86
Postfach 880
Federal Republic of Germany

VOLUME 13 NUMBER 20 / OCTOBER 23, 1975

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 2471

02 AERODYNAMICS 2474

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

03 AIR TRANSPORTATION AND SAFETY 2479

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 2480

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications*.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 2482

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

06 AIRCRAFT INSTRUMENTATION 2484

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER 2485

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 AIRCRAFT STABILITY AND CONTROL 2488

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 2488

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*.

12 ASTRONAUTICS (GENERAL) N.A.

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

13 ASTRODYNAMICS 2490

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 2491

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air)*.

15 LAUNCH VEHICLES AND SPACE VEHICLES 2491

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION N.A.

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING N.A.

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 2493

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

19 SPACECRAFT INSTRUMENTATION 2494
For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 SPACECRAFT PROPULSION AND POWER 2494
Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.
For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 2496
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 2496
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 2497
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics*.

26 METALLIC MATERIALS 2501
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 2505
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 2506
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion*.

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics*.

31 ENGINEERING (GENERAL) 2506
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 2507
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking*.

33 ELECTRONICS AND ELECTRICAL ENGINEERING 2512
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

34 FLUID MECHANICS AND HEAT TRANSFER 2515
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

35 INSTRUMENTATION AND PHOTOGRAPHY 2520
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation*.

36 LASERS AND MASERS 2523
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 2525
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 2528
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 2531
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences*.

42 GEOSCIENCES (GENERAL) 2535

43 EARTH RESOURCES 2535
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography*.

44 ENERGY PRODUCTION AND CONVERSION 2541
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation*.

45 ENVIRONMENT POLLUTION 2543
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 2547
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation*.

47 METEOROLOGY AND CLIMATOLOGY 2551
Includes weather forecasting and modification.

48 OCEANOGRAPHY 2559
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes life sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) 2562
Includes genetics.

52 AEROSPACE MEDICINE 2563
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES 2566
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT 2568
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY N.A.
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) N.A.

60 COMPUTER OPERATIONS AND HARDWARE 2570
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering*.

61 COMPUTER PROGRAMMING AND SOFTWARE 2571
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS N.A.
Includes computer networks.

63 CYBERNETICS 2573
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support*.

64 NUMERICAL ANALYSIS 2574
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY 2577
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS 2577
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS N.A.
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering*.

70 PHYSICS (GENERAL) 2579
For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar Physics*.

71 ACOUSTICS 2580
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution*.

72 ATOMIC AND MOLECULAR PHYSICS 2580
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS 2581
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation*.

74 OPTICS 2582
Includes light phenomena.

75 PLASMA PHYSICS 2583
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

76 SOLID-STATE PHYSICS 2585
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

77 THERMODYNAMICS AND STATISTICAL PHYSICS 2589
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) 2589
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT 2589
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 2590
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software*.

83 ECONOMICS AND COST ANALYSIS 2591
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE N.A.
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION 2591
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences*.

88 SPACE SCIENCES (GENERAL) N.A.

89 ASTRONOMY 2592
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 2593
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 2594
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

92 SOLAR PHYSICS 2594
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION 2595
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

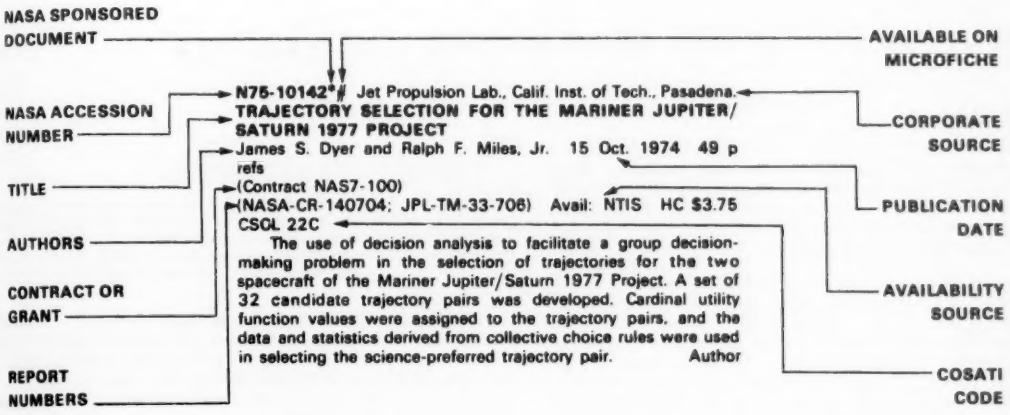
GENERAL

99 GENERAL 2596

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX I-1
PERSONAL AUTHOR INDEX I-45
CORPORATE SOURCE INDEX I-51
CONTRACT NUMBER INDEX I-65
REPORT/ACCESSION NUMBER INDEX I-69

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N75-10142*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
CORPORATE SOURCE
TRAJECTORY SELECTION FOR THE MARINER JUPITER/ SATURN 1977 PROJECT
TITLE
James S. Dyer and Ralph F. Miles, Jr. 15 Oct. 1974 49 p refs
PUBLICATION DATE
AUTHORS
(Contract NAS7-100)
CONTRACT OR GRANT
(NASA-CR-140704; JPL-TM-33-706) Avail: NTIS HC $3.75
AVAILABILITY SOURCE
CSCL 22C
COSATI CODE
REPORT NUMBERS
The use of decision analysis to facilitate a group decision-making problem in the selection of trajectories for the two spacecraft of the Mariner Jupiter/Saturn 1977 Project. A set of 32 candidate trajectory pairs was developed. Cardinal utility function values were assigned to the trajectory pairs, and the data and statistics derived from collective choice rules were used in selecting the science-preferred trajectory pair. Author

ON-GOING RESEARCH PROJECTS

This is a listing of research projects - not publications

AERONAUTICS

Includes Aeronautics (general); Aerodynamics; Air Transportation and Safety; Aircraft Communications and Navigation; Aircraft Design, Testing, and Performance; Aircraft Instrumentation; Aircraft Propulsion and Power; Aircraft Stability and Control; and Research and Support Facilities (air). For Related Information See Also Astronautics.

1.0001, YC-15 INTERIOR NOISE MEASUREMENTS

D.E. HINES, McDonnell Douglas Corporation, *Long Beach, California* 90808 (DF135770; F33657-72-C-0833)

Externally blown flap STOL aircraft using over the wing and under the wing configurations, such as the YC-14 and YC-15, will result in severe internal noise problems. The internal noise problem is a direct result of the close proximity of the engines to the crew and passenger compartments. The attainment of tolerable internal noise without the addition of 'dead weight' in soundproofing will require the development of methodology for decoupling the response of the fuselage structure from the STOL noise and vibration sources. The objective of this program is to obtain external and internal noise and vibration measurements from the YC-15 aircraft to establish a well defined data base to guide the development of the methodology for obtaining tolerable internal noise levels. An integrated structural-acoustic design will result in fuselage/soundproofing systems with high transmission loss with minimum weight.

This is a joint AFFDL/NASA (LARC) effort. Ground and flight acoustic measurements will be obtained on the YC-15 aircraft. These data will be obtained in conjunction with the flap loads measurements made on these aircraft under the NASA quiet propulsion lift technology (QPLT) program. The acoustic and vibration data will be analyzed in one-third octave and narrowband power and cross power spectra. Results will be used to provide an assessment of contribution to the internal noise from the various noise sources.

Supporting agency address information: AF Flight Dynamics Laboratory FYA, Wright-Patterson AFB, Ohio 45433

SUPPORTED BY U.S. Dept. of Defense - Air Force

1.0002, VARIABLE PERMITTIVITY LIQUID PHASE SHIFT

S. MIKUTERT, General Dynamics Corporation, *San Diego, California* 92112 (DF742170; F30602-75-C-0202)

This effort is intended to advance the Air Force capabilities in the areas of long-range detection, surveillance and ground control intercept systems, weather detection and penetration aid radars, air traffic control and navigational radar systems. Low-cost, reliable, moderate-to-high power, electronically controlled, reciprocal microwave phase shifters are needed to modify, improve, and extend the functional capabilities of existing and future medium-to-long range radars and to provide the inexpensive building blocks demanded of multielement, multifunctional, phased array antenna systems. The primary objective of this effort is to develop and characterize a reciprocal, high-power, liquid dielectric, analog phase shifter for operation and practical application in the s-band region of the microwave spectrum. The long-term overall objective is to develop and apply the technology necessary to synthesize any practical liquid dielectric medium featuring electronically controlled permittivity for use in large bandwidth phase shifting configurations at any microwave frequency. This request is for a continuation of an existing program, contract F30602-73-C-0325 which was initiated under the laboratory directors' discretionary funds, 01707307. The continuation of this effort offers a possible solution to the high-power variable phaser dilemma and could form the basis for a wide range of designs and transmission line applications at both low- and high-power levels.

The approach will follow a study and investigation of various liquid dielectric materials which will lead to the development of a practical, low-cost, high-power, electronically controlled, reciprocal microwave phase shifter. Studies will continue in search of methods to improve the buoyancy of particles in a dielectric medium having proper density or consistency for long term suspension. A search for new metallic and dielectric particles will be pursued with a view to obviate the present particle settling problem. Solutions of various liquid crystals will be synthesized and studied in expectation of eliminating the presently required liquid circulating system in some phase shifting applications. Low- and high-power testing and development will be carried out at ku- and s-band. The end items will be a breadboard model composed of the most optimum performing dielectric medium and ancillary control systems and a technical report. (Text Abridged)

SUPPORTED BY U.S. Dept. of Defense - Air Force

1.0003, AIR FREIGHT DISTRIBUTION CENTER FEASIBILITY STUDY

UNKNOWN, San Joaquin Co. Government, *Stockton, California* 95202 (045260 (HRB NO.))

This study is intended to provide information related to operational trade-offs in terms of realistic options of ways to increase capacity of the future air system. The Contractor shall perform the following tasks: (1) Investigate the possibilities of expedited handling of perishables to distant markets, and determine the requirements for staging, consolidation, and/or back-haul in order to make the operations economically sound. (2) Identify the availability of products and the volume of operations required for effective use of facilities. (3) Investigate the operational impact on the air and ground traffic of the immediate area. (4) Investigate conceptually the air freight plant facility requirements.

Document provided to S.S.I.E. by the H.R.I.S.

SUPPORTED BY U.S. Dept. of Transportation - Off. Sec.

1.0004, FOUNDATIONS ON PERMAFROST

G.H. JOHNSTON, Natl. Res. Council of Canada, Div. of Building Research, *Ottawa, Ontario K1a Or6, Canada* (110244 (HRB NO.))

Field studies are being conducted at several locations in northern Canada to observe the performance of various engineering structures erected on permafrost. These include building foundations, roads, airstrips, water retaining structures such as dams and dykes, and utilities (water, sewer etc.).

Bibliographic references: Engineering Design and Construction in Permafrost Regions: A Review by Kenneth A. Linell (U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire) and G.H. Johnston, Reprinted from Permafrost North American Contribution to the Second International Conference on Permafrost, Held in Yakutsk, Siberia, July 1973, pp 553-575. Construction on Permafrost, proceedings of Conference on Building in North America, pp 21-26.

Document provided to S.S.I.E. by the H.R.I.S.

SUPPORTED BY Canadian Government - Ottawa

1.0005, LEAD AS AN INDICATOR OF ENVIRONMENTAL QUALITY IN AIRPORT ENVIRONS
L.R. KLINESTIVER, U.S. Air Force, Frank J. Seiler Res. Lab., *Colorado Springs, Colorado* 80840 (DF281680)

AF function - environmental support of base operations (environmental impact of aircraft operations). Deficiency - no data are available on the concentrations, accumulation rates, or effects of many aircraft generated pollutants in the environs in and around military installations and air strips. Specifically, there is no data available on the build-up of lead in the air installation compatibility use zone (AICUZ). Build-up of lead and other toxic compounds is under close scrutiny by the EPA, and their standards are becoming increasingly more stringent. These standards will limit the boundaries of AICUZ's and limit their industrial and agricultural use. Research - techniques will be developed for assaying lead concentrations in the soil, fauna, and flora of the AICUZ of Peterson Field, Colorado Springs, Colo. Data obtained will be correlated to uncontaminated areas (control), to a highly contaminated, fossil fuel burning power plant area, and to all available EPA standards. How research contributes - techniques developed will allow evaluation of aircraft generated, lead pollution on USAF installations. Data generated from the Peterson Field environs will allow evaluation of possible health problems from lead contamination in and around AICUZ. Extrapolation of the data can be used to predict lead concentrations on other USAF installations, to predict the effects of lead accumulation in the future, and as a management tool for environmental planning.

Supporting agency address information: Frank J. Seiler Research Lab NC, USAF Academy, Colorado 80840

SUPPORTED BY U.S. Dept. of Defense - Air Force

1.0006, INVESTIGATION OF THE LOAD-BEARING CAPACITY OF CONCRETE STRUCTURES TO AIRPLANE CRASHES
UNKNOWN, Fed. Board For Arms Technology, *5400 Koblenz 1, Federal Republic of Germany* (RS0149)

SUPPORTED BY Federal Republic of Germany Govt.

1.0007, PILOT MODELING FOR MANNED SIMULATION
W.C. HOFFMAN, Aerospace Systems Incorporated, *Burlington, Massachusetts* 01803 (DF134070; F33615-75-C-3069)

Effective pilot models will permit efficient planning, execution, and analysis of manned simulations of aerospace vehicles. Unfortunately, present models are limited to highly simplified single and dual loop tracking tasks: they do not faithfully predict a pilot's reaction during realistic tasks. Therefore, this study will extend pilot modeling theory to multiloop tasks by including such effects as motion, visual cues, and instrument scanning. This study will yield important contributions to pilot modeling theory, as well as methods of evaluating simulations.

In FY75 contracted work will begin by accessing the various methods of modeling the human pilot. Deficiencies and advantages of particular methods will be noted, and areas for further research will be defined. New multiloop models, which include environmental cues, will be postulated and validated by experiment. The new pilot models will then be incorporated into methods which will be used to plan and analyze simulations.

Supporting agency address information: AF Flight Dynamics Laboratory FGD, Wright-Patterson AFB, Ohio 45433

SUPPORTED BY U.S. Dept. of Defense - Air Force

1.0008, EXPERIMENTAL STUDY OF SIMPLIFIED AIRCRAFT MODELS AND ADVANCED MEASUREMENT TECHNIQUE DEVELOPMENT
B.M. DUFF, Univ. of Mississippi, School of Engineering, *University, Mississippi* 38677 (DF041770; AF-AFOSR-2862-75)

Rigorous analytical solutions for the EMP-induced currents on the conducting surfaces of aircraft are not yet available. This study will pursue one particular aspect of the problem. A measurement program will be conducted on thin wire structures of unequal radii wires. The verification of the charge conditions at these junctions is an important step toward improvement of the theoretical models of aircraft. In addition, a design program will be conducted to develop the necessary experimental techniques and systems for future measurements of thick cylindrical models. Measured current and charge distributions covering a range of electrical sizes from thin wires to very thick cylinders would be a great help in the theoretical development.

Supporting agency address information: AF Office of Scientific Research NPP, 1400 Wilson Blvd., Arlington, Va. 22209

SUPPORTED BY U.S. Dept. of Defense - Air Force

1.0009, COMPREHENSIVE STUDY OF AIRCRAFT GAS TURBINE ENGINES
G.C. OATES, Univ. of Washington, School of Engineering, *Seattle, Washington* 98105

Description: A comprehensive study of aircraft gas turbine engines is being conducted. An overview of the performance and aerodynamics of aircraft gas turbine engines will be generated. An extensive section, with expert authors providing individual chapters dealing with current advanced problems in the industry, will be written.

SUPPORTED BY U.S. Dept. of Defense - Air Force

1.0010, THERMODYNAMICS OF BRIDGES, ROADWAYS, AND AIRPORT RUNWAYS
W.D. CARLSON, Univ. of Wyoming, Graduate School, *Laramie, Wyoming* 82070 (048946 (HRB NO.))

Using a thermodynamic model of a bridge, the project will investigate various methods to reduce the severity of freeze - thaw cycles in bridges. /FHWA/

Document provided to S.S.I.E. by the H.R.I.S.

SUPPORTED BY U.S. Dept. of Transportation - Off. Sec.

CHEMISTRY AND MATERIALS

Includes Chemistry and Materials (general); Composite Materials; Inorganic and Physical Chemistry; Metallic Materials; Nonmetallic Materials; and Propellants and Fuels.

3.0001, PRECIPITATION HARDENING OF ORDERED ALLOYS
A.J. ARDELL, Univ. of California, School of Engin. & Appl. Sci., *Los Angeles, California* 90024 (GH-31818 01)

The project will be directed primarily towards understanding precipitation-hardening in the Cu3Au-Co alloy system. Quantitative data on the critical resolved shear stress (CRSS), as a function of the average cobalt particle radius (r), will be obtained. This will permit an assessment of whether existing theories can account for the strengthening of both disordered and ordered Cu3Au by Co precipitates. Data will be obtained from single crystals containing 1.5 at. percent Co as well as 0.62 at. percent (the 1.5 at. percent Co single crystal has already been grown). Particle sizes will be measured, using the superparamagnetic properties of aged samples, and by transmission electron microscopy (TEM). Solid-solution strengthening of ordered but unaged crystals will also be investigated. Careful measurements of the properties of the ordered solid-solution by magnetic and X-ray techniques will be performed as a further test of the observed strengthening effects. X-ray techniques and TEM will be used to investigate the effect of Co on antiphase domain growth in more detail. Work will be initiated on the Cu3Au-Ni alloy system to help clarify the mechanism of solid-solution strengthening, which may be obscured in the Co-containing alloys by the possible clustering of Co.

This is a renewal of NSF grant GH-31818.

SUPPORTED BY U.S. Natl. Science Foundation

3.0002, DEFORMATION OF VANADIUM CONTAINING A HARD DISPERSED PHASE
C. ALTSTETTER, Univ. of Illinois, Materials Research Laboratory, *Urbana, Illinois* 61801

Description: Vanadium nitride particles within vanadium are obtained by appropriate alloying and heat treatments. Strips of alloyed material are used for the determination of strength and deformation behavior. Electron microscopy is used to characterize the nitride particle size range and spacing, which is correlated to the observed strengthening. Such information is used to test theories of strengthening applicable to the refractory metals, which have potential usefulness as nuclear reactor structural materials.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - O.U.D.

3.0003, HIGH-PRESSURE STUDIES TO IMPROVE THE EFFICIENCY OF LUMINESCENT DEVICES

H.G. DRICKAMER, Univ. of Illinois, School of Engineering, *Urbana, Illinois* 61801

Description: A very substantial fraction of the electrical energy produced in this country goes into lighting. Even a modest improvement in the efficiency of fluorescent and phosphorescent materials would result in a very significant saving of energy. In this laboratory we are studying the effect of pressure to 150-200 kilobars on the wave length of emission of phosphors, on the efficiency of emission and of energy transfer in sensitized phosphors, on thermoluminescence, and on luminescent lifetimes. Materials being studied include the oxygenated phosphors typically used in fluorescent lights, the ZnS phosphors used in television and oscilloscope screens, alkali halide phosphorus, organic crystallene phosphors, and polymeric and glassy luminescent materials. This last class of materials has particular promise. Work is also being initiated on high pressure electroluminescence with the idea of improving the efficiency of light-emitting diodes. The very significant effect of pressure on these luminescent processes is extremely helpful in understanding the mechanism and in improving the design of luminescent materials. A by-product of this research could be a design for more efficient effective lasers, especially lasers in the blue and near UV part of the spectrum.

Bibliographic references: (1) H.G. Drickamer, 'Exploratory Research at High Pressure,' in Materials under Pressure, Honda Memorial Volume (in press) (Y. Matsunaga and T. Hirone, editors); (2) C.W. Frank, C.P. Slichter, and H.G. Drickamer, 'Optical vs. Thermal Transitions in Solids at High Pressure,' Proc. Nat. Acad. Sci. 69, 933-37 (1972).

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - O.U.D.

3.0004, INTERFACIAL ENERGIES OF SOME AEROSPACE METALS AND ALLOYS

T.A. ROTH, Kansas State University, School of Engineering, *Manhattan, Kansas* 66502 (DF041660; AF-AFOSR-2868-75)

Aircraft structures and turbines, exposed to the elements world- wide, suffer general, and sometimes catastrophic, degradation. It is of particular interest to examine the surface and grain boundary energies of aerospace materials which oxidize or corrode with increasing severity depending upon alloy impurities, ambient gas impurities, and stress state. Many characteristics of metals are influenced directly by interfacial energies. These include - intergranular corrosion, fatigue strength, creep, frictional resistance, absorption, brittleness, solid state transformation, segregation, and adhesion. Unlike most of the other physical properties of metals, reliable data for surface and grain boundary energies are not generally available. Much of the present data has been extrapolated back to the solid from the liquid metal surface tension values. This research program will measure the interfacial energies of aerospace metals and alloys of interest by the zero-creep method and grain boundary grooving method. Initial studies of Al, Be, and current, widely-used alloys will be done in an inert atmosphere of helium over a range of temperatures near 0.9 of the melting point.

Supporting agency address information: AF Office of Scientific Research NE, 1400 Wilson Blvd, Arlington, Va 22209

SUPPORTED BY U.S. Dept. of Defense - Air Force

3.0005, MONOLAYER AND OVERLAYER QUANTUM FILMS

M. BRETZ, Univ. of Michigan, Graduate School, *Ann Arbor, Michigan* 48104 (DMR74-20917)

Research on monolayer and overlayer hydrogen and helium films physisorbed on homogeneous substrates will be initiated. The work is an outgrowth of, and firmly based on, continuing in depth investigations of helium films adsorbed on graphite. a) Heat capacity measurements of equilibrium H2, HD, and D2 partial monolayer films adsorbed on basal plane graphite. b) Heat capacity and thermal conductivity survey of overlayer H2 film on homogeneous substrates emphasizing those experimental configurations conducive to thin film superfluidity. c) Extension of previous multilayer helium film studies to below 1 K using dilution refrigeration.

SUPPORTED BY U.S. Natl. Science Foundation

3.0006, FLAME SPREADING ACROSS LIQUID FUELS

I. GLASSMAN, Princeton University, School of Engin. & Appl. Sci., *Princeton, New Jersey* 08540

Description: Fundamental studies of flame spreading across condensed-phase combustible materials can contribute much to an understanding of many problems which society today considers important and unanswered. In particular, one can mention such problems as aircraft fuel fire safety, combustion techniques for removal of oil spills, fabric flammability, rapid combustion through stratified fuel/air mixtures (flash over in home fires), etc. Earlier work at Princeton has shown that hydrodynamic convective effects in the liquid fuel play a dominant role in determining flame spreading rates over its surface and also the minimum layer of fuel which will sustain propagation. It has been postulated that this convective motion was a result of surface tension, and simple analytical calculations were performed which have supported these arguments. However, a complete analytical solution in which both the gas and liquid phase phenomena are treated simultaneously is being developed to obtain the flame spreading rate as an eigenvalue of the problem and to understand the relative importance of gas phase processes to the propagation mechanism. The development and evolution of the physical model upon which the theory is based is guided by experimental efforts which: (1) measure exact propagation velocities over the liquid surface, (2) to subsurface induced flow field parameters (temperature and velocity distribution), and (3) the induced gas phase flow field. It is important to note that the understanding of the burning and flame spreading over liquid fuels including determination of radiation effects and induced gas phase flow fields has far greater applicability than to liquid fires alone. The physical concepts and many of the experimental tools developed in these studies are also valuable to similar research on combustion and flame sreading over solid materials.

Bibliographic references: F.L. Dryer, H.J. Herring, A. Helmstetter, W.A. Sirignano and I. Glassman, 'Flame Spreading Across Liquid Fuels,' Princeton University Aerospace and Mechanical Sciences, Tech. Rep. No. 1140, Nov. 1973.

SUPPORTED BY U.S. Natl. Science Foundation

3.0007, FATIGUE MECHANISMS IN CARBIDE-REINFORCED EUTECTICS

N.S. STOLOFF, Rensselaer Polytechnic Inst., School of Engineering, *Troy, New York* 12181 (GH-42520)

The fatigue behavior of two unidirectionally solidified eutectic alloys in the system (Co, Cr, Ni)-TaC as a function of test temperature, phase distribution and stress range will be studied. These alloys have been chosen on the basis of their superior high temperature tensile and creep properties and the lack of any fundamental studies of mechanisms of fatigue in directionally solidified eutectics. Structures with varying inter-rod spacings, morphologies, and crystallography are to be grown; the resulting alloys each are to be studied in high cycle fatigue at three temperatures: 25 degrees C, 500 degrees C and 1000 degrees C. Low cycle fatigue studies are to be conducted at 25 degrees C and 1000 degrees C. Scanning electron microscopy, transmission electron microscopy and optical metallography are to be em-

ployed to study modes of crack initiation and propagation. Crack growth will be studied with the aid of a telescopic viewer. Emphasis will be on analysis of crack initiation and propagation mechanisms in model materials to provide understanding of factors leading to fatigue failure.

SUPPORTED BY U.S. Natl. Science Foundation

3.0008, MAGNETIC PROPERTIES AND PHASE RELATIONS IN DIRECTIONALLY SOLIDIFIED AND THIN FILM MNBI

M.R. NOTIS, Lehigh University, School of Engin. & Phys. Sci., *Bethlehem, Pennsylvania* 18015 (GH-42635)

The purpose of this study is three-fold: to clarify the phase relations and magnetic properties of MnBi; to produce an array of aligned single-phase MnBi rods to serve as a model material for tests of single-domain theory; and to perform initial experiments in search of a practical method of obtaining high coercive fields along with high saturation magnetization in an assembly of MnBi particles. To achieve these ends aligned rods of MnBi in a Bi matrix will be prepared by directional solidification and MnBi films will be deposited by RF sputtering. The phases present in these materials, their crystallographic and morphological distribution and their magnetic properties will be determined. The effect of replacing part of the Mn by Ti or by a 'magnetic element' such as Fe, Ni, or Co will also be examined. The relationship between sample structure and magnetic properties will be investigated. Preliminary studies have already produced aligned samples with intrinsic coercive fields as high as 24,000 Oe at room temperature and greater than 45,000 Oe at liquid nitrogen temperature. Clear evidence of a phase with Hc over 120,000 Oe at 77 degrees has been obtained.

SUPPORTED BY U.S. Natl. Science Foundation

3.0009, MICROSTRUCTURAL STABILITY IN THERMAL GRADIENTS

T.H. COURTNEY, Univ. of Texas, School of Engineering, *Austin, Texas* 78712 (GH-42960)

The stability of mechanical and physical properties of metals at high temperatures can be significantly altered by composition and microstructure changes. The redistribution of solutes can be a particularly acute problem when a temperature gradient is the driving force for segregation. Very little is known about the effect of metallurgical structure on the amount of segregation in a temperature gradient. Furthermore, there is evidence that the driving force for thermal diffusion depends upon concentration. Neither of these effects has been systematically investigated.

This research is concerned with an experimental evaluation of the effect of structural variables; namely, the effect of thermal diffusion on microstructure in metal alloys is to be examined. Systems to be studied are the Al-C, Al-AlCNi, Al-CuAl2, and Al-Si. These systems were chosen to reflect a wide range of composition and structural variables. Such information is relevant to the engineering evaluation of an alloy to be used at an elevated temperature when temperature gradients can persist.

SUPPORTED BY U.S. Natl. Science Foundation

3.0010, GRAPHITE RESEARCH

R. BLACKSTONE, Netherlands Reactor Center, *the Hague, the Netherlands*

In cooperation with the OECD Dragon project and KFA Julich irradiations are performed on various types of graphite at temperatures between 400-900 degrees C and 900-1400 degrees C. Furthermore an in- pile creep capsule has been developed, which will be used for radiation- induced creep experiments of graphite at about 900 degrees C. Secondly irradiations are being performed on dummy coated particles and compacts of dummy coated particles in graphite matrices. In 1975 a long-lasting irradiation experiment will be started on fuel-containing coated particles. The post irradiation investigation is concentrated on the determination of irradiation-induced changes in the density of pyrolytic graphite and silicon carbide coatings. The research on UO2-coated particles concerns a selection of advanced coated particles for the thorium cycles, possibly with oxygen getters in the fuel.

Addenda: Performing organization: Reactor Centrum Nederland.

SUPPORTED BY the Netherlands Government - the Hague

ENGINEERING

Includes Engineering (general); Communications; Electronics and Electrical Engineering; Fluid Mechanics and Heat Transfer; Instrumentation and Photography; Lasers and Masers; Mechanical Engineering; Quality Assurance and Reliability; and Structural Mechanics. For Related Information See Also Physics.

4.0001, ADVANCED THERMIONIC ENERGY CONVERSION RESEARCH AND DEVELOPMENT

N.S. RASOR, Rasor Associates Incorporated, *Sunnyvale, California* 94086

Description: The objective of this project is to demonstrate analytically and experimentally that fundamental improvements in thermionic energy conversion are possible which can substantially improve the performance of electrical power systems. Basic emphasis is on the plasma physics of the converter and on elimination of the arc potential drop through advanced operating modes and configurations. System design studies are emphasizing a thermionic heat exchanger concept for use in space nuclear power applications and for topping of central station electric power plants.

Bibliographic references: (1) N.S. Rasor and B.J. Britt, 'Practical Aspects of Research in Thermionic Energy Conversion,' (NSR-2- 1), (COO-2263-1, August 1973); (2) N.S. Rasor, 'Prospects for Thermionic Topping of Electric Power Plants,' Proceedings of 1st Southwestern Ohio Conf. on Energy and Environment, October 1973.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - S.N.S.D.

4.0002, HIGH CONTACT RATIO GEARS

H. FRINT, United Aircraft Corporation, *Stratford, Connecticut* 06497 (RTOP 505-04-41)

Description: The objective of this program is to experimentally determine by series of rig studies the applicability of a once-through microfog mist lubrication system for high-speed aircraft engine hearings and helicopter gears and to evaluate aspirator type emergency lubrication systems. Using lubrication and cooling concepts from previous microfog application contract studies at Mobil Research, full- scale, 125-mm and 46-mm bore bearing test rigs at speeds study several selected lubricant-mist applicator-cooling combinations at speeds to give up to 3 x 10 to the minus 6th power DN values (product of speed in rpm and bearing bore diameter in mm) and bearing cuter race temperatures to 500 degrees F. Following short-term step-speed testing, 50-hour mist system studies are being conducted of operating a 3-1/2 inch diameter Ryder type gear with microfog lubrication. It has been demonstrated in preliminary studies using a NASA-developed reclassifier nozzle and cooling jar (at 200 degrees F), at loads up to 200,000 psi (max. Hertz stress), 12,500 rpm speeds, and gear temperatures to 500 degrees F. Longer term gear testing studies are now underway.

SUPPORTED BY U.S. Dept. of Defense - Army

4.0003, RESEARCH INTO THE GAS DYNAMICS OF HIGH-ENERGY CHEMICAL LASERS

A.L. ADDY, Univ. of Illinois, School of Engineering, *Urbana, Illinois* 61801 (ARO-D DAHC-04-74-G-0112)

Description: To define and propose solutions to gas-dynamic problems encountered in the design and development of continuous- operation, high-energy chemical lasers. Our objectives are to investigate flow problems related to laser-cavity design, laser mirror- cavity design, nozzle array design, and ejector-diffuser system design. The building of a practical high-energy laser system can not be accomplished without resolving these and related problems that are now surfacing.

Bibliographic references: Addy, A.l. & Mikkelsen, D.C., 'An Investigation of Flow in and Ejector-diffuser Systems for Chemical Lasers,' ARO-D, DAHC-04-74G-0112, Final Technical Report, December 1974.

SUPPORTED BY U.S. Dept. of Defense - Army

4.0004, FLUID MECHANICS OF FUSION REACTORS, MHD GENERATORS, FAST BREEDER REACTORS AND HYDRAULIC TURBINES

J.S. WALKER, Univ. of Illinois, School of Engineering, *Urbana, Illinois* 61801 (GK-37427)

This project includes a number of theoretical studies in fluid mechanics which are related to a wide variety of energy-related problems but which are tied together by analytical similarities. Solutions in magnetohydrodynamics (MHD) are being sought in order to calculate the power required to pump a liquid-metal coolant through the strong magnetic fields required to confine the plasma in fusion reactors, in order to design liquid-metal MHD generators, in order to develop MHD pumps which promise to reduce the energy requirements of metal foundries, and in order to design electromagnetic devices to control pressure surges in the liquid-sodium loops of liquid-metal fast breeder reactors during certain disasters. Solutions in ordinary hydrodynamics are being sought for liquid flows through expansions and contractions which are rotating about axes perpendicular to their center lines in order to understand the flows inside the impellers of hydraulic turbines and centrifugal pumps. The analysis required for these rotating flows is closely related to that for MHD flows, the rotation vector playing an analytical role comparable to that of the magnetic field. All of these studies employ the method of matched asymptotic expansions.

Bibliographic references: (1) J.S. Walker and G.S.S. Ludford, 'Three-dimensional MHD duct flows with strong transverse magnetic fields. Part 3. Variable-area rectangular ducts with insulating walls,' J. of Fluid Mechanics, Vol. 56, p. 121, 1972; (2) J.S. Walker and G.S.S. Ludford, 'MHD flow in insulating circular expansions with strong transverse magnetic fields,' Int. J. of Engineering Science, Vol.12, p. 1045, 1974.

SUPPORTED BY U.S. Natl. Science Foundation

4.0005, GAS DYNAMICS OF DIFFUSERS FOR GAS DYNAMIC LASERS

B.A. REESE, Purdue University, School of Mechanical Engin., *Lafayette, Indiana* 47907

Description: Study of the starting of single-staged and series-staged flow apparatus simulating gas dynamic lasers. Both experimental and analytical studies have been conducted. To date there have not been any unanticipated results.

SUPPORTED BY U.S. Dept. of Defense - Navy

4.0006, DESIGN OF COMBINED NOZZLE-BASE-BOATTAIL SYSTEMS AND THE ANALYSIS OF THREE-DIMENSIONAL INTERNAL TRANSONIC FLOWS

H.D. THOMPSON, Purdue University, School of Mechanical Engin., *Lafayette, Indiana* 47907 (F33615-73-C2010)

Description: Produce a production computer program for the optimized design of a Nozzle-Base-Boattail system including the effects of external flow and lose pressure. Also, investigate the effects of the transonic solution on the performance prediction of thrust nozzles. Investigate and develop an analytical method of predicting the flow variables in the transonic region of a three dimensional thrust nozzle.

Bibliographic references: (1) Pasley, Stephen A. and Hoffman, Joe D., 'Flow Field Analysis of a Nozzle-Base-Boattail System,' AFAPL Technical Report TR-74-38, May 1974; (2) Moy, Robert J. Jr.; Thompson, H. Doyle; and Hoffman, Joe D., 'Comparison of Transonic Flow Solutions in C-D Nozzles,' Technical Report, AFAPL-TR-74-110, November 1974.

SUPPORTED BY U.S. Dept. of Defense - Air Force

4.0007, RADIATION INTERACTION IN CONVECTIVE HEAT TRANSFER

J.R. LLOYD, Univ. of Notre Dame, School of Engineering, *Notre Dame, Indiana* 46556 (GK-43618)

Description: This study is concerned with an analytical and experimental investigation of the interaction of thermal radiation with convection. The investigation will center on situations arising in combustion problems such as nonhomogeneous gases and geometries that require finite-difference solutions. Although this proposal is centered on two specific problems, the basic knowledge gained from this research can be extended to other situations where the interaction of radiation with the other modes of heat transfer is important. The ability of being able to realistically predict the influence of radiation on heat transfer in furnaces, combustors, and unwanted fire spread as well as on pollutant formation, to cite a few examples, is extremely important.

SUPPORTED BY U.S. Natl. Science Foundation

4.0008, EFFECTS OF TURBULENCE AND SHEAR ON FLOW PAST BLUFF BODIES

A.A. SZEWCZYK, Univ. of Notre Dame, School of Engineering, *Notre Dame, Indiana* 46556 (GK-42991)

Description: The object of this investigation is to determine the effect of shear on the flow past finite bluff bodies. It is envisioned that the initial investigation will take place with a tailored linear velocity profile with low turbulence. In later studies the effect of turbulence superimposed on the shear flow will be studied past the same bluff bodies used in the initial experiments. The following sets of experiments will be carried out: 1) investigation of shear flow with low intensity turbulence, 2) investigation of a shear flow with medium intensity turbulence, and 3) investigation of a shear flow with high intensity turbulence. This research gives insight to air flow around tall buildings which is important to the determination of energy losses from such buildings.

SUPPORTED BY U.S. Natl. Science Foundation

4.0009, HEAT TRANSFER FROM SUPERSONIC STEAM JET SUBMERGED IN WATER

K.T. YANG, Univ. of Notre Dame, School of Engineering, *Notre Dame, Indiana* 46556 (ONR N00014-68-A-0152)

Description: This study is concerned with the experimental investigation of the velocity, temperature and pressure fields surrounding a supersonic steam jet discharging into a channel with slow- moving water flow. Six different flow regions have been identified as a function of the axial pressure ratio across the jet, each giving rise to distinct jet bubble shapes and noise emission characteristics. Detailed analysis based on high-speed photography is now underway. Results are expected to be directly applicable to reactor cooling system safety problems.

Bibliographic references: 'Vapor-Liquid Interaction in a High Velocity Vapor Jet Condensing in a Coaxial Water Flow,' R.J. Young, K.T. Yang and J.L. Novotny, Proceedings of the 5th International Heat Transfer Conference, Vol. III, pp. 226-230, 1974.

SUPPORTED BY U.S. Dept. of Defense - Navy

4.0010, SCATTERING AND PROPAGATION FOR OBJECTS OF ARBITRARY SHAPES WITH APPLICATIONS TO INTEGRATED AND FIBER OPTICS

L. EYGES, U.S. Air Force, Cambridge Research Labs., *Bedford, Massachusetts* (DF245140)

AF function - operation and navigation of aircraft. Deficiency - information transmission via electric circuitry between various parts of aircraft, and various crew members, involves bulky equipment of low bandwidth, subject to cross talk and jamming. Objective - to devise integrated optics circuits for information transmission by guided light waves that ameliorates above deficiences. How research contributes - analysis of propagation properties of realistically-shaped dielectric wave guides and of cross talk and loss mechanisms provides theoretical parameters for effective practical design.

Extend recent novel methods for scattering by arbitrary dielectric objects to problem of guided wave propagation down dielectric guides of arbitrary cross section. Exploit recently discovered integral equations to determine effect of surface roughness, bends in guides, and loss mechanisms. Extend work on coupling of scalar guides to coupling of dielectric guides for vectorial electromagnetic waves.

Supporting agency address information: AF Cambridge Research Laboratories LQ, L. G. Hanscom AFB, Bedford, Mass 01730

SUPPORTED BY U.S. Dept. of Defense - Air Force

4.0011, LASER FUSION FEASIBILITY RESEARCH
M. LUBIN, Univ. of Rochester, School of Engin. & Appl. Sci., *Rochester, New York* 14627 (ASDA 206)

Description: The Laser Fusion Feasibility project is now in its third year of a 44-month first phase. The work to date has resulted in the development and operation of the world's most powerful pulsed laser and has demonstrated thermonuclear fusion reactions utilizing this system. Four laser beam lines have been installed. Ultimately, the system will focus the aggregate intensity of ten laser beam lines to bombard targets of light atoms in order to raise their temperature and initiate a fusion reaction.

SUPPORTED BY Exxon Corporation - Houston, Texas

4.0012, ACOUSTIC EMISSION FOR DAMAGE DETECTION IN USAF COMPOSITE STRUCTURAL COMPONENTS
R.A. NOBLE, U.S. Air Force, Flight Dynamics Lab., *Dayton, Ohio* 45433 (DF126260)

Fibrous composite materials, such as boron fibers in any epoxy matrix, are being used in modern USAF airframes. Weight and cost savings are expected when the reliability and maintainability of these composite airframes are proven in appropriate structural tests. Acoustic emission monitoring techniques will be used to develop a measurement tool for structural tests of USAF composite airframes. The objective of this effort is to design, build, and evaluate a prototype acoustic emission system which includes amplitude and frequency discrimination.

Prototype acoustic emission sensing and analysis circuitry will be designed, tested, and evaluated. Experimental investigations on damage in composite specimens will be performed using acoustic emission monitoring with real-time spectral analysis of the emitted signals to identify type of damage and damage progression. Static tests of composite specimens with previously induced flaws are planned.

Supporting agency address information: AF Flight Dynamics Laboratory FBT, Wright-Patterson AFB, Ohio 45433

SUPPORTED BY U.S. Dept. of Defense - Air Force

4.0013, MAGNETOFLUID DYNAMICS & LASER INTERACTION WITH MATTER
W. CHRISTIANSEN, Univ. of Washington, School of Engineering, *Seattle, Washington* 98105

Description: Theoretical & experimental studies for conversion of heat or electricity into laser radiation. Development of high efficiency lasers. Beam power transmission is also being investigated together with laser heating of plasmas for possible use in laser fusion studies.

SUPPORTED BY U.S. Natl. Science Foundation

GEOSCIENCES

Includes Geosciences (general); Earth Resources; Energy Production And Conversion; Environment Pollution; Geophysics; Meteorology and Climatology; and Oceanography. For Related Information See Also Space Sciences.

5.0001, STRATOSPHERIC CHLOROFLUOROMETHANE (FREON) ACCUMULATION - A PRELIMINARY TECHNOLOGY AND POLICY OPTION ASSESSMENT OF THE CONSEQUENCES
R.B. SCHAINKER, Systems Control Incorporated, *Palo Alto, California* 94304 (SRP75-14878)

Chlorofluoromethanes are used as propellants for aerosol cans and as refrigerants. These gases are currently the subject of growing concern in the scientific community. Some scientists claim that they threaten to reduce the ozone layer in the stratosphere, and consequently increase the amount of ultra-violet radiation reaching the earth's surface. The objective of this short term technology assessment will be (a) parametrically examine the nature and scope of the aerosol problem as related to alternative possible levels of ozone in the stratosphere-- identify and estimate the uncertainties involved in this postulated threat; (b) carry out a preliminary assessment of the possible consequences--physical, biological, sociological, and economic--in order to identify the major potential problem areas; (c) clarify and specify a range of government action options and their consequences--including costs and benefits of the various alternative policy options. The primary purpose of this effort will be to identify the most promising alternatives that could best address potential biospheric effects of ozone reduction.

SUPPORTED BY U.S. Natl. Science Foundation

5.0002, EFFECTS OF MAN-MADE CLOUD CONDENSATION NUCLEI ON MARINE FOGS, CLOUDS, AND PRECIPITATION
E.E. HINDMAN, U.S. Navy, Weapons Center, *Ridgecrest, California* 93555 (DN582151)

To determine the extent and impact of cloud condensation nuclei (CCN) emitted from coast urban regions and naval installations on local marine fogs, clouds, and precipitation. Such information must be determined to permit meaningful predictions of the consequences of increased man-made CCN on these weather elements.

Extensive and thorough measurements of CCN from man-made sources and from air uncontaminated by man will be made in coastal regions. Drop size distributions will be measured in fogs and clouds affected by the man-made sources of CCN and in fogs and clouds unaffected by these sources. From these data, the effect of man-made CCN on the visibility in marine fogs and microstructure of clouds will be determined. The effects of these particles will be predicted using warm fog and warm cloud models. The cumulus model will be used to predict the effects of man-made CCN on precipitation from maritime clouds.

Supporting agency address information: Naval Weapons Center, China Lake, Calif. 93555

SUPPORTED BY U.S. Dept. of Defense - Navy

5.0003, THE FORMATION AND DISSIPATION OF COASTAL FOG
J.K. ZIKMUNDAGOODMAN, Calif. State Univ. & Colleges, Graduate School, *San Jose, California* 95114 (GA-42464)

The proposed research involves the gathering of data on the microphysical and dynamic properties of fog to describe the complicated formation and dissipation processes of natural fog. Measurements of visibility, liquid water content, drop-size distribution, drop concentration, and nuclei concentration will be made throughout the life cycle of each fog case at various levels on the Mt. Sutro Tower, in the heart of San Francisco. As part of other studies on the Tower, vertical profiles of temperature, humidity, pressure, wind, and radiative flux will also be available. The evolution of fog in each case will be represented by analysis of the variation in time and space of each parameter within the fog. Each fog case will be classified according to the synoptic situation and the statistical properties of different cases compared. The

role of condensation nuclei (type and size distribution) in determining the microphysical characteristics of fog will be of special interest.

SUPPORTED BY U.S. Natl. Science Foundation

5.0004, FEDERAL-PROVINCIAL AEROMAGNETIC SURVEYS - LABRADOR, MELVILLE PENINSULA, AND COPPERMINE AREAS

P. HOOD, Canadian Dept. of Ener. & Rso., Resources Geophy. & Geoch. Div, *Ottawa K1a Oe8, Ontario, Canada* (690072)

Objective: 1. To provide the Geological Survey of Canada with adequate aeromagnetic maps of areas selected on the basis of the needs of Regional and Economic Geology Division in relation with the mapping program. 2. To provide the mining and oil industries with basic information which could help in orienting their mineral exploration program.

SUPPORTED BY Canadian Government - Ottawa

5.0005, FEDERAL-PROVINCIAL AEROMAGNETIC SURVEYS - KEEWATIN AND MACKENZIE

P. HOOD, Canadian Dept. of Ener. & Rso., Resources Geophy. & Geoch. Div, *Ottawa K1a Oe8, Ontario, Canada* (690068)

Objective: 1. To provide the Geological Survey of Canada with adequate aeromagnetic maps as an aid in orienting the geological mapping program. 2. To provide the mining and oil industries with an aid in exploration and geological research.

SUPPORTED BY Canadian Government - Ottawa

5.0006, GAMMA-RAY SPECTROMETRY (EXPERIMENTAL SURVEYS)

K.A. RICHARDSON, Canadian Dept. of Ener. & Rso., Resources Geophy. & Geoch. Div, *Ottawa K1a Oe8, Ontario, Canada* (720071)

Objective: Application of new developments in gamma-ray spectrometry techniques to geologic mapping and exploration by making cross-country reconnaissance surveys and detailed area surveys. Geologic interpretation and evaluation of airborne gamma-ray results, with aid of ground and laboratory investigations. Investigation of radioelement distribution pattern within Canada.

SUPPORTED BY Canadian Government - Ottawa

5.0007, SURVEY OF THE DISTRIBUTION OF PERMAFROST

R.J. BROWN, Natl. Res. Council of Canada, Div. of Building Research, *Ottawa, Ontario K1a Or6, Canada* (108654 (HRB NO.))

The collection of information on the distribution of permafrost in Canada, and physical factors affecting this has been undertaken. It is based on information collected from the technical literature, reports from others operating in permafrost areas, and from direct field observations. Surveys in the discontinuous permafrost zone have been conducted to date along roads in Yukon Territory, Northwest Territories, and northern British Columbia, northern Alberta, northern Saskatchewan, and northern Manitoba. Surveys by helicopter have been conducted in northern Ontario and northern Quebec & Labrador. Prior to field surveys, aerial photographs were examined to select areas and terrain features that appeared to be potential permafrost locations. Field investigations of the climatic and terrain factors affecting the occurrence and distribution of permafrost have been undertaken at Norman Wells, N.W.T. and Thompson, Manitoba. Work is continuing. Investigations are being carried out on the distribution of permafrost in boundary area between the discontinuous permafrost zone and continuous permafrost zone. Investigations are also being initiated on the distribution of permafrost in the mountainous regions of western Canada & the arctic islands.

Bibliographic references: Permafrost, T.A. Harwood and R.J.E. Brown, Background Papers to the Earth Sciences in Canada, National Advisory Committee on Research in the Geological Sciences, Geological Survey of Canada, Paper GSC 69-56, pp. 124-133, 1973.

Document provided to S.S.I.E. by the H.R.I.S.

SUPPORTED BY Canadian Government - Ottawa

5.0008, STRATOSPHERIC DISTRIBUTION OF THE FLUOROCARBONS AND OTHER CONSTITUENTS IN THE EFFECT OF CHLORINE POLLUTANTS IN THE OZONE LAYER (ABBREV)

D.G. MURCRAY, Univ. of Denver, School of Arts, *Denver, Colorado* 80210 (DES75-15764)

This research will support a series of balloon flights made to measure the present distribution of the fluorocarbons. The measurements would be made with existing instrumentation so that data can be obtained shortly after the receipt of the grant.

The controversy on the possible environmental effects of the SST has resulted in a number of detailed studies being made of the photochemical processes that occur in the stratosphere. These studies have shown that the amount of ozone present in the ozone layer can be significantly affected by relatively small concentration of some pollutants. One pollutant which appears particularly troublesome is chlorine. It was initially assumed that space shuttles would be the major source of stratospheric chlorine pollution. However, it has recently been pointed out that the fluorocarbons (aerosol spray) are possibly much more of a potential threat to the ozone layer than space shuttles. Detection of absorptions due to CF2Cl2 in solar spectra obtained in 1968 with a balloon-borne spectrometer system proves that the fluorocarbons are getting into the stratosphere. Further measurements are needed to verify the initial measurements and to determine how rapidly the fluorocarbons are increasing in the stratosphere as well as to check the photochemical reaction scheme.

SUPPORTED BY U.S. Natl. Science Foundation

5.0009, STUDIES OF SATELLITE-OBSERVED TYPHOONS AND THE DIURNAL CYCLE OF PRECIPITATION AND CLOUDINESS OVER THE OCEANS

W.M. GRAY, Colorado State University, School of Engineering, *Fort Collins, Colorado* 80521 (8-162; 04-3-158-51 MOD. 02)

The objective is to better describe the typical characteristics of wind, temperature, and moisture distribution in satellite-observed Western North Pacific typhoons and in intensifying tropical cloud clusters. This will be done using rainfall and rawinsonde data composites together with satellite cloud photographs (primarily the DMSP data). Improved description of the diurnal variation in cloudiness, precipitation, and wind convergence over the tropics also is an objective. These aims hopefully will lead to better input to numerical models and to improved numerical forecasts of tropical atmospheric circulations.

The approach will be the same as the principal investigator has used in his earlier work -- that of numerically compositing large amounts of rawinsonde and rainfall data. Compositing will utilize a cylindrical coordinate system relative to the cyclone center, and the large amount of data will permit considerable grouping by intensity, latitude and stage of development. Over 2 years of rawinsonde data and more than 40,000 individual soundings are available.

Earlier work by the principal investigator and his assistants has dealt with the wind, temperature, and moisture structure of Western North Pacific and Caribbean cloud clusters. Work currently in progress includes study of Western North Pacific Typhoons and of the diurnal variability of wind and rainfall.

SUPPORTED BY U.S. Dept. of Commerce - N.O.A.A.

5.0010, SUPPORT OF THE GEOPHYSICS RESEARCH BOARD - STUDY OF USES OF BALLOONS FOR SCIENTIFIC PURPOSES

P.J. HART, Natl. Acad. of Sciences, *Washington, District of Columbia* 20037 (MPS 75-13363; C310-316-000)

A Balloon Study Committee will be formed to: 1. Evaluate the past achievements and future promise of balloon-borne research as a scientific tool for fundamental studies in physics and astronomy. 2. Compare the effectiveness of ballooning vs. alternate techniques. 3. Identify future needs for development and funding.

SUPPORTED BY U.S. Natl. Science Foundation

5.0011, SUPPORT OF THE CLIMATIC IMPACT COMMITTEE
W. SPINDEL, Natl. Acad. of Sciences, *Washington, District of Columbia* 20037 (MPS75-17012; C310-311-000)

The Academy's Climatic Impact Committee (CIC), with some reconstitution of its membership, and with a new specialist panel in the field of atmospheric chemistry, will be continued in order to provide advice to DOT, NASA, NSF, EPA, and NOAA regarding the short and long range health and climatic effects of inadvertent modifications of the atmosphere, and particularly the stratosphere, from all sources, natural as well as man-made, including the large-scale use of chlorofluoromethanes (CFM's), and the space shuttle. The CIC has competence in meteorology, atmospheric chemistry and dynamics, as well as in the biological and climatic effects of ultraviolet radiation. This Committee will critically evaluate the existing relevant data and calculations, and recommend to the interested agencies priorities and urgency for further research needed to extend the existing data base. The Committee is expected to issue a report on potential effects of CFM's and the space shuttle within one year.

SUPPORTED BY U.S. Natl. Science Foundation

5.0012, TECHNIQUES OF GEOCHEMICAL EXPLORATION IN THE SONORAN ENVIRONMENT, WITH EMPHASIS ON A SEARCH FOR COPPER
M.A. CHAFFEE, U.S. Dept. of the Interior, Geological Survey, *Washington, District of Columbia* 20242 (AG-525)

In cooperation with the Council of Natural Non-Renewable Resources (CRNNR) of Mexico the USGS proposes an experimental-studies program to develop new geochemical, geophysical, and geological exploration techniques to search for mineral deposits in the Sonoran environment. A 5-year program is proposed beginning in FY 1974. The study areas will be selected principally within (but will not necessarily be limited to) the State of Sonora, Mexico and contiguous areas in the United States. Emphasis in the investigations will be placed on developing and applying new techniques which would be useful in evaluating the base- and precious-metal resource potential of arid lands which have a geologic, structural, and metallogenic environment similar to the basin and range provinces of the southwestern United States.

A metal-potential map should be compiled for the Mexican portion of the basin and range provinces extending the recently published copper- potential map of southern Arizona. Such a map would show major structural features, areas of known or potential metallization and hydrothermal alteration, and areas of post-mineralization-age rock units. Small-scale ERTS imagery and newly available large-scale Skylab imagery will be utilized in establishing regional geological controls of ore- deposit distribution. In addition to such a regional compilation, detailed geologic studies will be conducted at selected deposits to determine petrologic, chemical, and genetic data which would be useful in the search for new deposits.

SUPPORTED BY U.S. Natl. Science Foundation

5.0013, OPTIMAL IMPLANTATION CONDITIONS FOR CAPTURING WIND ENERGY IN A GIVEN SITE
M. DUCHENEMARULLAZ, French Min. of Equipment, Building Ind. Sci. & Tech. Ctr. *75116e Paris, France*

Goal: Since we are currently experiencing serious energy shortages and high energy costs, we should not ignore the possibility of transforming the energy contained in wind into electricity. In addition to technological problems of constructing equipment, we must also determine favorable sites for setting-up wind blades so that they can achieve the best possible output.

Method: The topography of a site profoundly modifies flow structure and the temperature distribution of the surrounding air. The speed up observed at the crest of a slope depends on both these factors and especially on how often their favorable or unfavorable conditions coincide. This is why a statistical study is needed for average flow speeds and vertical temperature gradients (air stability). Studying the particular case of pouzauges (and relationship to results from the CSTB Nantes station) is an indispensable step toward a regional generalization of stability classes.

Progress: We have used a mathematical model to show the role of stability on the amplitude coefficient of the increased speed of air at the top of an obstacle. The STELA mini-calculator program has been modified for acquiring the climatological data needed for the study.

1975 Program: Drawing up average flow statistics measured at different areas of a slope, in relation to stability classes. Studying the stability classes characteristic of the site and correlating them with those acquired at the CSTB Nantes Station.

Equipment: Atmospheric local environment telemeasurement system.

SUPPORTED BY French Government - Paris

5.0014, TURBULENT ATMOSPHERIC DIFFUSION PHENOMENA ASSOCIATED WITH GASEOUS WASTES FROM NUCLEAR THERMAL POWER STATIONS
UNKNOWN, Electricite De France, *76008 Paris, France*

Perfecting techniques for in situ examination allowing us to follow the development of clouds or plumes of gaseous effluents in the air and to measure the characteristic parameters of this development.

Perfecting a group of methods for calculating the atmospheric diffusion of gaseous effluents, adapted to various types of nuclear thermal power station wastes (continuous, discontinuous) to the existing meteorological infra structure and to different space and time scales.

Validating the theoretical results of numerical models, using corresponding measurements obtained on location.

Adapting in situ measurement techniques and computation methods so that they will be able to take into account local meteorological phenomena (seaside location, valley location, etc.)

Addenda: Supporting agency and Performing organization - Electricite De France, Direction Des Etudes et Recherches.

SUPPORTED BY Electricite De France - Paris

5.0015, ESTIMATING AND CONTROLLING THE HEATING OF WATER
UNKNOWN, Electricite De France, *76008 Paris, France*

Developing techniques of measuring and controlling temperatures in aquatic areas receiving or likely to receive hot water ejected by thermal power stations (especially developing infrared air teledetection techniques).

Addenda: Supporting agency and Performing organization - Electricite de France, Direction des Etudes et Recherches.

SUPPORTED BY Electricite De France - Paris

5.0016, SOLAR POWER SYSTEM AND COMPONENT RESEARCH
J.D. WALTON, Georgia Inst. of Technology, Engineering Experiment Station, *Atlanta, Georgia* 30332 (GI-41305)

Description: The overall purpose of the program is to develop equipment and techniques for producing commercial quantities of electrical power using solar radiation as the source of energy. This research effort is concerned with investigation of a central receiver system which will use solar energy to produce superheated steam, use the steam to drive conventional turbines and electrical generating equipment, and feed the generated electrical power into a commercial power distribution network.

Bibliographic references: Update on the 'Solar Power System and Component Research' Program, F.A. Blake, Martin Marietta Aerospace, J. D. Walton, Georgia Institute of Technology, presented at the International Solar Energy Society, U.S. Section Annual Meeting, Fort Collins, Colorado, August 21-23, 1974.

SUPPORTED BY U.S. Natl. Science Foundation

5.0017, NORTH PACIFIC CLOUDINESS AND CLOUD ANOMALIES FROM SATELLITE OBSERVATIONS
J.C. SADLER, Univ. of Hawaii, School of Arts & Sciences, *Honolulu, Hawaii* 96822 (GX-42007)

The major objective of the North Pacific Experiment is to develop a basis for explaining the mechanisms responsible for the

large-scale oceanic and atmospheric fluctuations that occur in the mid-latitudes of the North Pacific Ocean. Two general hypotheses of the type that may account for large-scale ocean-atmosphere fluctuations over the North Pacific Ocean are: Hypothesis I: That major fluctuations in the central Pacific are induced by air/sea interactions occurring in the equatorial region. Hypothesis II: Cycles observed in equatorial regions are explained in terms of central North Pacific phenomena. Central North Pacific ocean phenomena have been shown to affect North American weather.

Cloudiness is a most important variable in the problem of air/sea interaction and, therefore, basic to the NORPAX program. This project will utilize the excellent daily cloud observations from meteorological satellites to portray the cloudiness over the NORPAX area from February 1965. The published cloud atlas will include maps of the long-term monthly means, monthly means for individual years, departures of monthly means from the long-term means, etc. to see if teleconnections attributed to either hypothesis will stand the test of observed cloudiness.

SUPPORTED BY U.S. Natl. Science Foundation

5.0018, THE IMPACT OF SUBURBAN DEVELOPMENT ON DRAINAGE NETWORKS

W.L. GRAF, Univ. of Iowa, Inst. of Urban & Regional Res., *Iowa City, Iowa* 52240 (A-059-IA)

Numerous environmental changes result from the change of land use from rural to suburban activities. As suburban development overtakes drainage basins, floods become larger and more frequent, erosion is accelerated in some areas, and deposition of sediment is initiated elsewhere. These processes are controlled in part by changes in vegetation and surfaces brought about during suburbanization, and are well understood. However, equally important changes in the spatial characteristics of drainage networks by the addition of artificial channels remain little known, and are the subject of the proposed study. Changes in natural drainage networks near Davenport and Iowa City, Iowa by the addition of man-made channels (in the forms of streets, gutters, and sewers) will be analyzed for the time period 1837-1974 using data derived from historical city maps, topographic maps, aerial photographs, stream gauge data, and field investigations. Products of the study will include mathematical relationships which specify the changes in drainage networks that accompany suburbanization, and which may be of predictive value in suburban planning and design.

SUPPORTED BY U.S. Dept. of Interior - O.W.R.T.

5.0019, EFFECTS OF TRAFFIC AND ROADS ON THE ENVIRONMENT IN RURAL AREAS

K. KANEYASU, Japanese Ministry of Constr., *280 Chiba Shi, Chiba Ken, Japan* (115251 (HRB NO.))

The emphasis of this study is the influence of highway traffic on the environment in rural areas. In fiscal 1974 research has been done mainly on plants. The first step was an investigation on the biological factors and the utility of the remote sensing method by airplanes as a means of research. /IRRD-IRF/

Document provided to S.S.I.E. by the H.R.I.S.

SUPPORTED BY Japanese Government - Tokyo

5.0020, POLAR CAP DURING AURORAL SUBSTORMS

E.G. MULLEN, U.S. Air Force, Cambridge Research Labs., *Bedford, Massachusetts* (DF246050)

AF function - satellite and transpolar communications, radar and navigation. Deficiency - the polar ionosphere is presently very unpredictable to such a degree that the above functions are frequently degraded or crippled. Objective - to define the polar cap ionospheric/magnetospheric environment during auroral substorms. Data from the Geopole Observatory will be analyzed for precursors of auroral substorms. The poleward expansion of auroral substorms will be investigated. Data is also provided to the AWS Space Environmental Support System (SESS). How research contributes - the high latitude ionospheric environment effects AF ground, airborne, and satellite communication, radar and navigation systems. The short range contribution is better specification of ionospheric parameters for AWS and its customers, OTH radar SPO's communication satellite SPO's, survivable communications, DMSP and GPS. The long-range contribution will be to assist the complete theoretical understanding of the complex magnetospheric interactions ultimately necessary for reliable operation of the above functions.

The dynamic processes in the high latitude ionosphere are connected to and controlled in part by magnetospheric processes and interactions. Understanding of the ionosphere or magnetosphere is dependent on understanding these interactions. This research utilizes the AFCRL Geopole Observatory, a unique observatory located near the magnetic north pole and instrumented with photometers, spectrometers, radio receivers, magnetometers, and cameras. Data from the Geopole Observatory are integrated with other ground station, airborne and satellite data taken simultaneously during periods of auroral substorms. The Geopole Observatory will continue to provide real-time data to Air Force Global Weather Central for input into the Space Environmental Support System.

Supporting agency address information: AF Cambridge Research Laboratories LI, L. G. Hanscom AFB, Bedford, Mass 01730

SUPPORTED BY U.S. Dept. of Defense - Air Force

5.0021, HIGH-PERFORMANCE LMFBR FUEL MATERIALS

J.L. GREEN, Los Alamos Scientific Lab., *Los Alamos, New Mexico* 87544

Description: More advanced fuel element systems for high-performance LMFBR application are designed and tested and the overall irradiation performance of these systems is critically evaluated. The investigations are directed toward the evolution of the basic fuels and materials technology required for the definition and design of advanced LMFBR concepts having superior breeding capabilities. Fuel element designs are developed, evaluated, and characterized to utilize the potential of more advanced fuels such as the carbides and nitrides with the emphasis placed on the uranium-plutonium carbides. Steady-state irradiation testing is carried out in EBR-II and will be continued in FTR to provide information on the behavior and performance limits under steady-state conditions of the entire fuel system operating in an environment similar to large commercial cores. Testing is carried out on developmental designs in EBR-II under off-normal conditions and in TREAT under transient conditions to ascertain the effect of operating incidents on continued safe and reliable service of a particular fuel element system. Failure thresholds and modes are defined for both normal and defected fuel elements under more severe operating conditions. Thermophysical and chemical properties and characteristics of ceramic plutonium fuels are determined. QA controls are applied to all aspects of this program.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - R.R.D.D.

5.0022, HIGH-TEMPERATURE FUEL TECHNOLOGY FOR NUCLEAR PROCESS HEAT

P. WAGNER, Los Alamos Scientific Lab., *Los Alamos, New Mexico* 87544

Description: The broad objective is to improve existing nuclear fuel technology for high-temperature gas-cooled reactors. The purpose of the current work is to develop improved high-temperature coated- particle, graphite-matrix nuclear fuels which would have applications in gas-cooled reactors in obtaining higher coolant outlet temperatures such as might be required for high-temperature nuclear process heat. The program includes (a) design and development of improved fission-product- retaining coated particles to permit increased temperature capability, (b) development of improved fuel bodies by incorporating commercially available coated particles into graphite matrices, (c) incorporation of the improved coated particles into graphite matrices, and (d) evaluation of coated particles and fuel bodies in neutron-activation, thermal, and prolonged-irradiation testing.

Bibliographic references: (1) A.R. Dreisner, E.K. Storms, P. Wagner, and T.C. Wallace, 'High Temperature-Low Density ZrC Insulators made by Chemical Vapor Deposition,' Proceedings of

the 4th International Conference on Chemical Vapor Deposition, Oct. 7e12, 1973; (2) P. Wagner, 'Research, Development and Production of Sub-Stoichiometric ZrC High Temperature Insulation,' LA-5224, July 1973.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - R.R.D.D.

5.0023, 2-8 HZ INFRASOUND GENERATED BY CLEAR AIR TURBULENCE

E.S. POSMENTIER, City University of New York, Graduate School, *New York, New York* 10031 (GA-42794)

The objectives of the study are: (1) the confirmation of the hypothesis that 4-8 Hz infrasound observed at the earth's surface is generated by Clear Air Turbulence (CAT), (2) an explanation of the generating mechanisms, and (3) an evaluation of infrasound measurements as a remote, passive, atmospheric sounding method for the detection and study of CAT. The methods of acoustic array design and data analysis developed and applied in the preliminary investigation will be used in this study. However, instead of inferring the presence of CAT from rawinsonde data as in the preliminary investigation, CAT will be observed by high-power FM-CW radar at a cooperating institution.

SUPPORTED BY U.S. Natl. Science Foundation

5.0024, COMMUNITY NOISE ANNOYANCE SURVEY

P. BARSKY, Columbia University, Graduate School, *New York, New York* 10027 (036755 (HRB NO.))

This project is an experimental and analytical investigation of the noise around JFK Airport generated by aircraft, surface transportation, and other sources. In general, relationships between annoyance responses and changes in transportation near JFK Airport since 1969 will be analyzed. The 1972 survey will indicate three full years' effects. This project will be accomplished as follows; Analysis of detailed changes in operations for months of June-September for years 69, 71, and 72, personal interviews, a community questionnaire approved by OMB, a sample design population living near JFK will be sampled at four different distances from the airport, and telephone conversations will be held with persons exposed to noise from JFK.

Document provided to S.S.I.E. by the H.R.I.S.

SUPPORTED BY U.S. Dept. of Transportation - Off. Sec.

5.0025, PILOT PLANT DEVELOPMENT OF THE AGGLOMERATING BURNER GASIFICATION PROCESS

W.M. GOLDBERGER, Battelle Memorial Institute, *Columbus, Ohio* 43201

Description: Initial, smaller-scale development of the agglomerating burner coal gasification process was conducted at Battelle in the early and mid-sixties under industrial sponsorship. The objective of the current program is larger scale development of the process to be useful as part of a system for producing synthetic, pipeline-quality, natural gas from coal. Pursuant to the objective a 25-ton-a-day of coal Process Development Unit (similar to a Chemical Process Pilot Plant) was designed and is being erected and will be operated to examine the larger-scale operability of the process. Concurrent with operation of the pilot plant enough process data and information will be acquired to permit scale-up of the process to its next logical stage of development.

Bibliographic references: (1) Corder, W.C., and Goldberger, W.M., 'Status of the Battelle/Union Carbide Coal Gasification Process Development Unit Installation,' proceedings of the Sixth Synthetic Pipeline Gas Symposium, October 28-30, 1974, to be published by the American Gas Association; (2) Corder, W.C., and Goldberger, W.M., 'Design, Installation, and Operation of a 25-ton-a-day Coal Gasification Process Development Unit for the Agglomerating Burner-Gasification Process,' R&D Report No. 97 - Interim Report No. 1, prepared for Office of Coal Research, Department of the Interior, by Battelle's Columbus Laboratories, October, 1974.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - O.C.R.

5.0026, FISCHER-TROPSCH AND RELATED PROCESSES FOR CONVERTING COAL TO LIQUID FUELS OR PIPELINE GAS

A.J. FORNEY, U.S. Dept. of the Interior, Bureau of Mines, *Pittsburgh, Pennsylvania* 15213

Description: Development of a process for making a crude oil and a gas of 800 to 900 Btu/cu ft through use of the Fischer-Tropsch reaction with gas derived from coal gasification. Development of an improved catalytic process for upgrading Fischer-Tropsch product to gasoline, diesel and jet fuels. Development of an economical process for converting coal into a clean, liquid methanol fuel, to be used as a gasoline extender, utility fuel and home heating fuel, and for fuel cells.

SUPPORTED BY U.S. Dept. of Interior - Bureau of Mines

5.0027, DEVELOPMENT OF MODULAR INTEGRATED UTILITY SYSTEMS WITH DEVELOPMENT OF COAL FIRED GAS TURBINE AND ANNUAL ENERGY CYCLE

A.J. MILLER, Holifield National Laboratory, *Oak Ridge, Tennessee* 37830 (HUD-IAA-H-40-72)

Description: The Modular Integrated Utility System (MIUS) Program is devoted to development and demonstration of the advantages of on-site integrated systems for providing all or several of the utility services for a community. Services include electric power, heating and cooling, potable water, liquid waste treatment, and solid waste management. The objective of MIUS is to provide services consistent with reduced use of natural resources, protection of the environment, and minimized cost. The ORNL effort has consisted of conceptual design and systems analyses. It has included examination of the possibility of employing coal as MIUS fuel in a fluidized bed combustion system coupled to a closed cycle gas turbine. HUD and the Office of Coal Research are now sponsoring a multiphase program of study of coal-fueled MIUS systems and design, development, and construction of laboratory demonstrations of favorable concepts. The effort has also included examination of an Annual Cycle Energy System (ACES) in which heat is pumped from a static water tank to a domestic hot water heater and to occupied space during winter, and over the duration of the heating season most of the water in the tank is converted to ice for summer air conditioning. An experimental program for development and demonstration of this cycle now authorized by HUD is in progress, and joint sponsorship by the Federal Energy Administration is anticipated.

Bibliographic references: (1) A.J. Miller, G. Samuels, W.J. Boegly, and L. Breitstein, 'Technology Evaluation for MIUS,' Paper No. 739149, presented at the 8th Intersociety Energy Conversion Engineering Conference, Philadelphia, PA., August 13-16, 1973. Available in the Proceedings published by American Institute of Aeronautics and Astronautics. (2) A.P. Fraas, 'Small Coal Burning Gas Turbine for Modular Integrated Utility Systems,' Paper No. 749017, presented at the 9th Intersociety Energy Conversion Engineering Conference, San Francisco, CA., August 26-30, 1974. Available in the Proceedings published by the American Society of Mechanical Engineers.

SUPPORTED BY U.S. Dept. of Housing & Urban Development

5.0028, MAPPING OF THE CIRCULATION COASTAL WATER (IN CONNECTION WITH COASTAL-SITUATED POWER STATIONS)

H.W. VANHULTEN, Netherlands Comm. Rem. Tech., *Delft, the Netherlands*

Problem and objective: The relatively fresh river water does not mix very easily with sea water, due to temperature and specific gravity differences. For a better understanding of this complex process (in relation with the tidal movements and the direction of the wind) temperature and salt concentration measurements are performed every year in the spring (at the surface

of the water and in vertical direction). Complementary to this, IRLS recordings are carried out from an aeroplane. During the spring there is a significant correlation between the temperature and the salt concentration, so an extrapolation can be made for the temperature at the surface of the water. The objective of the infrared observations is to identify water bodies by their temperature as a means to describe the complex moving and mixing pattern of coastal waters. Maps of both absolute and relative isotherms can be used for this purpose.

Addenda: Performing organization: Nederlandse Interdepartementale Werkgemeenschap voor her Applicatie-onderzoek van Remote Sensing Technieken NIWARS.

SUPPORTED BY the Netherlands Government - the Hague

5.0029, STUDY OF ATMOSPHERIC AND ELECTRICAL CONDUCTIVITY AS RELATED TO AIR QUALITY.
S.E. JENNINGS, Univ. of Durham, *Durham Dh1 3le England, United Kingdom* (DA0C9380; DAJA37-75-C-1913)

To study some of the physical characteristics of natural atmospheric aerosols, utilizing samples from Durham Observatory and the Northern Pennines.

Undertake both field sampling and laboratory analysis techniques. A number of aerosol characteristics will be studied over a wide range of meteorological parameters so as to establish factors which control or modify aerosol parameters. Study relevant to: communications; employment of lasers; study of air pollutions; small area forecasting; and Army aviation.

Supporting agency address information: AMC European Research Offices (Europe), Box 15, US Forces, FPO NY 09510

SUPPORTED BY U.S. Dept. of Defense - Army

LIFE SCIENCES

Includes Life Sciences (general); Aerospace Medicine; Behavioral Sciences; Man/system Technology and Life Support; and Planetary Biology.

6.0001, AIRCREW PROTECTIVE CLOTHING AND DEVICES
L.F. PAULSEN, U.S. Navy, Aerospace Recovery Facil., *El Centro, California* 92243 (DN937931)

Subtask 01: to determine operational suitability of aircrew protective clothing and devices. Subtask 02: to determine compatibility of personnel detection, survival and rescue systems/devices with inflight escape systems and with parachute recovery systems. Subtask 03: to develop and upgrade, test and evaluate recovery system hardware components.

Subtasks 01 and 02: specific test programs will be designed and conducted to satisfy operational requirements. Subtask 03: review existing designs in light of needs; develop and/or contract for test items; test, finalize design, compile data package.

Supporting agency address information: Naval Air Systems Command, Washington, D.C. 20360

SUPPORTED BY U.S. Dept. of Defense - Navy

6.0002, CARDIOVASCULAR AGING IN YOUNG MEN AND WOMEN
W.K. HARRISON, Johns Hopkins University, School of Medicine, *Baltimore, Maryland* 21205 (HL 18277-01)

Newly-developed computer analysed non-invasive techniques will be used in this study of physiological aging. Many different quantitative aspects of cardiac function measured by these techniques will be evaluated in a selected group of men and women, 20-40 years of age. Sex differences in aging of members of the group will be examined after effects due to body size and other sources of unwanted variability have been controlled. Effectiveness of the multiple objective physiological measurements of cardiac function as estimates of chronological age will be tested in data obtained. Healthy airline pilots, stewards, and stewardesses will undergo detailed medical evaluation before the special tests are given at the airline medical department (UA laboratory). High fidelity ballistocardiograms (Bcg) and percutaneous carotid arterial pulse recordings (CP) will then be obtained according to a new computer- oriented procedure developed by the applicant. The specially formatted analog tape recordings of these tests will subsequently be converted into digital tape format by an edit program in an IBM 370/145 computer. These edited digital tapes will be analysed by another program for feature recognition and detailed measurement of Bcg and CP in the same computer. Results of these analyses, along with clinical data on the subjects, will then be evaluated with the aid of standard biomedical statistical programs to elucidate aging trends which are expected in the data.

SUPPORTED BY U.S. Dept. of Hlth. Ed. & Wel. - N.I.H.

6.0003, PILOT WORKLOAD
P. SUN, U.S. Army, Avionics Laboratory, *Red Bank, New Jersey* 07703 (DA0D2817)

An attempt to develop a physiological workload index that can be useful in the evaluation of avionic systems.

To establish a performance workload parameter in steady-state tracking tasks by utilizing the adaptive loading method. The workload of the particular tracking task is reflected by the allowable amount of additional time delay (transport lag) that can be inserted into each control axis while maintaining a certain prescribed performance level. Measured physiological data (e.g., ECG, EMET, respiration rate) will be correlated against the performance workload parameter in the process of developing the physiological workload index.

Supporting agency address information: ECOM Avionics Lab, Ft. Monmouth, NJ 07703

SUPPORTED BY U.S. Dept. of Defense - Army

6.0004, EFFECTS OF ITEM-OPTION WEIGHTING ON RELIABILITY & VALIDITY OF THE AF OFFICER QUALIFYING TEST AS USED FOR THE SELECTION OF PILOTS
M. REE, U.S. Air Force, Human Resources Labs., *San Antonio, Texas* 78236 (DF232380)

To investigate the effects of item-option weighting on the internal consistency reliability and standard error of measurement on the AFOQT as used in the selection of pilots. The study will also investigate the effects of item-option weighting on the validity of the pilot selection composite and on the magnitude of subtest intercorrelations. The study will compare the results of item-option weighting with the procedure currently used. Benefits to the Air Force are potential improvement in pilot selection.

A sample of 2000 officers who began pilot training and who took a single form of the AFOQT will be selected. 1000 will be randomly selected into the validation sample and 1000 into the cross-validation sample. Their test item responses will be used to develop item-option weights for each option of each item in the AFOQT. The speeded section will be shortened to render effectively unspeeded. Three scores will be developed for each subject. These scores are: sum of the number marked correctly, the conventional correction for guessing, and the sum of the item-option weights selected. Reliability of the three scores for the pilot composite and individual subtests will be compared. Item-option weight reliability will be estimated via parallel forms from validation and cross-validation sample. The criterion for validation will be passing/failing pilot training. The validity of the three scoring system for composites and subtests will be compared. Cross-validation will be carried out. The effect of the item-option weighting on subtest intercondition will be investigated by comparing the intercorrelation obtained using each of the three scoring systems.

Supporting agency address information: AF Human Resources Laboratory PES, Lackland AFB, Texas 78236

SUPPORTED BY U.S. Dept. of Defense - Air Force

PHYSICS

Includes Physics (general); Acoustics; Atomic and Molecular Physics; Nuclear and High-energy Physics; Optics; Plasma Physics; Solid-state Physics; Thermodynamics and Statistical Physics. For Related Information See Also Engineering.

8.0001, DEVELOPMENT OF ADVANCED ISOTOPE SEPARATION TECHNIQUES
M.O. SCULLY, Univ. of Arizona, School of Liberal Arts, *Tucson, Arizona* 85721

Description: The advanced isotope separation technology program is investigating and developing isotope separation techniques, other than gaseous diffusion or centrifuge, which have the potential of significantly reducing the cost of obtaining isotopic materials for a variety of uses. Program emphasis is placed upon the evaluation of alternative laser-induced uranium-235 separation techniques. These separation programs have the potential for providing significant long- term economic benefits to the civilian power market and to the AEC's weapons production program. The uranium separation effort is particularly important due to the fully committed status of current national enrichment capacity. A number of processes have been proposed for the laser photochemical separation of uranium isotopes. Two particular processes are being pursued through scientific and engineering feasibility experiments and one of these processes has been demonstrated on a laboratory scale basis. Other concepts being evaluated include aerodynamic methods, electromagnetic methods using chemi-ionization, and chemical exchange methods using liquid-liquid chromatography and complexing agents with particular tailor-made structures.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - M.A.D.

8.0002, DEVELOPMENT OF ADVANCED ISOTOPE SEPARATION TECHNIQUES
C.B. MOORE, Lawrence Berkeley Laboratory, *Berkeley, California* 94720

Description: The advanced isotope separation technology program is investigating and developing isotope separation techniques, other than gaseous diffusion or centrifuge, which have the potential of significantly reducing the cost of obtaining isotopic material for a variety of uses. Program emphasis is placed upon the evaluation of alternative laser-induced uranium-235 separation techniques. These separation programs have the potential for providing significant long- term economic benefits to the civilian power market and to the AEC's weapons production program. The uranium separation effort is particularly important due to the fully committed status of current national enrichment capacity. A number of processes have been proposed for the laser photochemical separation of uranium isotopes. Two particular processes are being pursued through scientific and engineering feasibility experiments and one of these processes has been demonstrated on a laboratory scale basis. Other concepts being evaluated include aerodynamic methods, electromagnetic methods using chemi-ionization, and chemical exchange methods using liquid-liquid chromatography and complexing agents with particular tailor-made structures.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - M.A.D.

8.0003, FAST REACTOR SAFETY STUDIES
W.E. KASTENBERG, Univ. of California, School of Engin. & Appl. Sci., *Los Angeles, California* 90024

Description: This is a continuing program of laboratory experiments and analysis to acquire information for the assessment of the safety of future LMFBR plants of commercial size. Use of the present oxide fuel as well as the advanced carbide, nitride, and metallic fuels is considered. The program includes analytical work on the transient behavior of fuel elements, accident analysis, and thermodynamic considerations on the behavior of irradiated fuel materials in thermal transients, as well as laboratory experiments upon phenomena of importance in post-accident heat removal and molten fuel- coolant interactions.

SUPPORTED BY U.S. Nuclear Reg. Comm. - Washington, D.C.

8.0004, LIGHT SCATTERING STUDIES OF SPIN-FLIP PROCESSES IN SEMICONDUCTORS AND OF ANOMALOUS PHASE TRANSISTORS IN INSULATORS
J.F. SCOTT, Univ. of Colorado, School of Arts & Sciences, *Boulder, Colorado* 80302 (GH-34681 A02)

Light scattering experiments supported under GH-34681 will be continued. Laser light scattering experiments will be performed on p- and n-type wide-bandgap semiconductors in very high magnetic fields. Both intravalence band spin-flip and intervalence band spin-flip processes will be examined, with particular emphasis upon spin-flip of photo-injected carriers.

Light scattering studies of phase transitions involving coupled modes will be continued. The Raman and Brillouin spectra of BaMnF4 near its second-order antiferroelectric transition at Tc equal 255K will be investigated. Strong phonon-magnon coupling near T will be characterized in FeC12-2H20. With Brillouin and autocorrelation spectroscopy the linewidth of the central modes in TmVO4, and BaMnF4 and RbCoF3 will be measured.

SUPPORTED BY U.S. Natl. Science Foundation

8.0005, COLLISIONAL EXCITATION OF RADIATIVE VIBRATIONAL MODES IN SOME SIMPLE POLYATOMIC MOLECULES
R.B. SUBBARAO, Yale University, Graduate School, *New Haven, Connecticut* 06520 (DF041780; AF-AFOSR-2863-75)

An Air Force critical research need exists in the delineation of the high-altitude rocket plume enhancement region. This effort addresses the basic mechanisms of the prime enhancement. The research will determine the cross-sections for collisional excitation of polyatomic molecules to radiative states. In particular, an examination will be made of the excitation of H2O and CO2 by collisions with themselves, with each other, and with N2 or O2. These cross-sections will be determined by measuring the infrared radiation from a collision region in which the free jets from two diametrically opposed small nozzles meet head on. By acceleration with a light carrier gas and by varying the temperature of the nozzle sources, collisions will be brought about in the energy range from the threshold value of about half an ev to a maximum of about six ev. Recent developments in the laboratory on methods of molecular beam modulation and expected improvements in signal processing should increase the effective technique sensitivity by several orders of magnitude. Thus, one should be able to detect excitation cross sections as small as 10 to the minus 20th power square cm.

Supporting agency address information: AF Office of Scientific Research NA, 1400 Wilson Blvd, Arlington, Va 22209

SUPPORTED BY U.S. Dept. of Defense - Air Force

8.0006, DEVELOPING REMOTE CONTROL ULTRASOUND TEST TECHNIQUES FOR FAST BREEDER REACTORS (REPEATED TESTING/PREPARATORY PROGRAM)
L. JOGOROFF, Interatom Gmbh, *5060 Bensberg, Nordrheim West., Federal Republic of Germany* (RS0143)

SUPPORTED BY Federal Republic of Germany Govt.

8.0007, BASIC STUDIES FOR THE REACTOR GRAPHITE DEVELOPMENT PROGRAM
UNKNOWN, Univ. of Karlsruhe, Inst. For Chemical Technology, *7500 Karlsruhe, Federal Republic of Germany* (ATT6074)

SUPPORTED BY Federal Republic of Germany Govt.

8.0008, SOLID-STATE PHYSICS RESEARCH
D.I. PRICE, Argonne National Laboratory, *Argonne, Illinois* 60439

Description: A program devoted to radiation damage by ions, electrons and neutrons in metals and insulators and to the elementary defects produced in these materials. Topics of current interest in metal physics include elementary defects and their interactions, defect production and trapping rates, distribution of

defects, properties of divacancies and larger cluster impurity effects, deviations from Matthiessen's rule, and theoretical studies of defect formation and migration in metals. Radiation damage in insulators includes work on lithium niobate, sapphire, spinel, lucalox, barium titinate and glasses; topics studied involve optical and electrical effects, dimensional changes, stress formation and relief, surface destruction, blister formation and spallation.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - P.R.D.

8.0009, DEVELOPMENT OF ADVANCED ISOTOPE SEPARATION TECHNIQUES
J. POWELL, U.S. Energy Res. & Dev. Admin., Ames Research Laboratory, *Ames, Iowa* 50010

Description: The advanced isotope separation technology program is investigating and developing isotope separation techniques, other than gaseous diffusion of centrifuge, which have the potential of significantly reducing the cost of obtaining isotopic materials for a variety of uses. Program emphasis is placed upon the evaluation of alternative laser-induced uranium-235 separation techniques. These separation programs have the potential for providing significant long- term economic benefits to the civilian power market and to the AEC's weapons production program. The uranium separation effort is particularly important due to the fully committed status of current national enrichment capacity. A number of processes have been proposed for the laser photochemical separation of uranium isotopes. Two particular processes are being pursued through scientific and engineering feasibility experiments and one of these processes has been demonstrated on a laboratory scale basis. Other concepts being evaluated include aerodynamic methods, electromagnetic methods using chemi-ionization, and chemical exchange methods using liquid-liquid chromatography and complexing agents with particular tailor-made structures.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - M.A.D.

8.0010, OPEN CYCLE COAL BURNING MHD POWER GENERATION
J.F. LOUIS, Mass. Inst. of Technology, School of Engineering, *Cambridge, Massachusetts* 02139 (INT-14-32-0001-1209)

Description: An interdisciplinary faculty group guides and performs research at M.I.T. in magnetohydrodynamic (MHD) power generation. The MHD system combined with the steam plant may result in subsequent increases of overall power plant efficiency. At M.I.T., the goals of the MHD group are centered on the first elements of the development program needed for MHD power plants. These three first elements are (a) engineering analysis, (b) scientific demonstration of new concepts at the laboratory bench scale, (c) engineering demonstration of successful scientific concepts at the minimum critical scale. The other tasks of such an overall program such as testing of prototypes and demonstration plants can be best performed by industry. With these goals in mind, the activities are focused on the critical areas of inter-electrode breakdown, disk generator performance, generator stability, maintenance of electrodes and insulators in the presence of clean gases and slag, development of new electrode materials, coal desulfurization, ash behavior, slag condensation, and computer modeling of MHD systems. In the field of superconducting magnets, the feasibility of adapting conventional hollow conductor technology to high field superconducting MHD magnets is being investigated. A facility providing simulated conditions for fluid mechanics, testing of MHD materials, and development of protective conditions will be developed. M.I.T. also participates in the US-USSR cooperative program in MHD, begun in 1973.

Bibliographic references: (1) Louis, J.F. et al., 'Open Cycle Coal Burning MHD Power Generation: An Assessment and a Plan for Action,' Office of Coal Research R & D Report No. 71, February 1972; (2) Schneider, S. J. and J. F. Louis, 'MHD Effects on Viscous and Thermal Wakes and Their Influence on the Performance,' Proc. 14th MHD Symposium, Tullahoma, April 1974.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - O.C.R.

8.0011, DEVELOPMENT OF ADVANCED ISOTOPE SEPARATION TECHNIQUES
K. BOYER, Los Alamos Scientific Lab., *Los Alamos, New Mexico* 87544

Description: The advanced isotope separation technology program is investigating and developing isotope separation techniques, other than gaseous diffusion or centrifuge, which have the potential of significantly reducing the cost of obtaining isotopic materials for a variety of uses. Program emphasis is placed upon the evaluation of alternative laser-induced uranium-235 separation techniques. These separation programs have the potential for providing significant long- term economic benefits to the civilian power market and to the AEC's weapons production program. The uranium separation effort is particularly important due to the fully committed status of current national enrichment capacity. A number of processes have been proposed for the laser photochemical separation of uranium isotopes. Two particular processes are being pursued through scientific and engineering feasibility experiments and one of these processes has been demonstrated on a laboratory scale basis. Other concepts being evaluated include aerodynamic methods, electromagnetic methods using chemi-ionization, and chemical exchange methods using liquid-liquid chromatography and complexing agents with particular tailor-made structures.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - M.A.D.

8.0012, DEVELOPMENT OF ADVANCED ISOTOPE SEPARATION TECHNIQUES
W. SPINDEL, Yeshiva University, Graduate School, *New York, New York* 10033

Description: The advanced isotope separation technology program is investigating and developing isotope separation techniques, other than gaseous diffusion or centrifuge, which have the potential of significantly reducing the cost of obtaining isotopic materials for a variety of uses. Program emphasis is placed upon the evaluation of alternative laser-induced uranium-235 separation techniques. These separation programs have the potential for providing significant long- term economic benefits to the civilian power market and to the AEC's weapons production program. The uranium separation effort is particularly important due to the fully committed status of current national enrichment capacity. A number of processes have been proposed for the laser photochemical separation of uranium isotopes. Two particular processes are being pursued through scientific and engineering feasibility experiments and one of these processes has been demonstrated on a laboratory scale basis. Other concepts being evaluated include aerodynamic methods, electromagnetic methods using chemi-ionization, and chemical exchange methods using liquid-liquid chromatography and complexing agents with particular tailor-made structures.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - M.A.D.

8.0013, NONLINEAR BEHAVIOR OF UNSTABLE PLASMA IN THE THRESHOLD REGIME
A. SIMON, Univ. of Rochester, School of Engin. & Appl. Sci., *Rochester, New York* 14627 (E(11-1)-3497)

Description: The identification of instabilities in experiments operating in steadily oscillating non-linearly saturated regimes. Analysis of non-linear relations that produce saturation (or fail to do so), which can then suggest means for feedback control or for favorable modification of the stability threshold. Since instabilities still are a major concern in obtaining sufficient containment in fusion devices, the research should be of value in devising means of easing the constraints they bring in. Threshold analysis may also have some value in dealing with turbulent regimes.

Bibliographic references: (1) D.A. Monticello, Albert Simon, Phys. Fluids 17, 791 (1974); (2) V.G. Abhayankar and A. Simon, Phys. Fluids 17, 261 (1974).

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - C.T.R.D.

8.0014, SOLID-STATE PHYSICS RESEARCH
B.C. FRAZER, Brookhaven Natl. Lab., *Upton, New York* 11973

Description: Defect studies employing position annihilation lifetime and Doppler-broadening measurements on irradiated samples. Simultaneous optical absorption and luminescence measurements during electron or gamma-ray irradiation of LiF. Electron irradiation studies of metals preirradiated with 14 MeV neutrons. Effects of radiation on thermal decomposition and color center formation in ammonium perchlorate. Properties and applications of charged-particle tracks in dielectrics. Calculations of X-ray scattering from graphite crystals containing defects. Calculations of damage energy cross-sections and primary recoil spectra for Controlled Thermonuclear Research neutron sources. Investigations on the properties of non-ideal materials and studies utilizing particle-solid interactions as diagnostic probes in solid-state research. Studies of equilibrium properties of crystal defects by positron annihilation lifetime and Doppler broadening measurements. X-ray and neutron scattering studies of the omega phase transformation in zirconium-niobium alloys. Channeling investigations of charge-exchange in thin Au crystals. Stopping power calculations for channeled particles. Diffraction studies of anharmonicity, bonding electrons and impurity locations.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - P.R.D.

8.0015, DEVELOPMENT OF ADVANCED ISOTOPE SEPARATION TECHNIQUES
R.E. WESTON, Brookhaven Natl. Lab., *Upton, New York* 11973

Description: The advanced isotope separation technology program is investigating and developing isotope separation techniques, other than gaseous diffusion or centrifuge, which have the potential of significantly reducing the cost of obtaining isotopic materials for a variety of uses. Program emphasis is placed upon the evaluation of alternative laser-induced uranium-235 separation techniques. These separation programs have the potential for providing significant long- term economic benefits to the civilian power market and to the AEC's weapons production program. The uranium separation effort is particularly important due to the fully committed status of current national enrichment capacity. A number of processes have been proposed for the laser photochemical separation of uranium isotopes. Two particular processes are being pursued through scientific and engineering feasibility experiments and one of these processes has been demonstrated on a laboratory scale basis. Other concepts being evaluated include aerodynamic methods, electromagnetic methods using chemi-ionization, and chemical exchange methods using liquid-liquid chromatography and complexing agents with particular tailor-made structures.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - M.A.D.

8.0016, MATERIALS CHEMISTRY RESEARCH
L.R. ZUMWALT, Univ. of North Carolina, School of Engineering, *Raleigh, North Carolina* 27600

Description: This research is concerned with the sorption behavior of volatile fission product metals in nuclear grade graphites. The program involves the determination, in situ, of the equilibrium vapor pressures of cesium, as a function of its concentration and temperature for various mixtures of cesium, strontium and barium sorbed by two typical nuclear grade graphites such as one now being used in a high- temperature gas-cooled reactor core. Cesium sorption isotherms will be obtained for concentrations of strontium and barium likely to be encountered under normal operating conditions, i.e. in the temperature range of 800 degrees to 1200 degrees C. The experimental information obtained will be analyzed to obtain a model by which the vapor pressures of cesium for mixtures of sorbed fission products may be predicted from single component sorption data. Existing theoretical models will be evaluated and revised as necessary in light of the new experimental data to enhance their accuracy in estimating the metal fission product release from nuclear graphites.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - P.R.D.

8.0017, DEVELOPMENT OF ADVANCED ISOTOPE SEPARATION TECHNIQUES
R.A. SCHWIND, Monsanto Research Corporation, *Miamisburg, Ohio* 45342

Description: The advanced isotope separation technology program is investigating and developing isotope separation techniques, other than gaseous diffusion or centrifuge, which have the potential of significantly reducing the cost of obtaining isotopic materials for a variety of uses. Program emphasis is placed upon the evaluation of alternative laser-induced uranium-235 separation techniques. These separation programs have the potential for providing significant long- term economic benefits to the civilian power market and to the AEC's weapons production program. The uranium separation effort is particularly important due to the fully committed status of current national enrichment capacity. A number of processes have been proposed for the laser photochemical separation of uranium isotopes. Two particular processes are being pursued through scientific and engineering feasibility experiments and one of these processes has been demonstrated on a laboratory scale basis. Other concepts being evaluated include aerodynamic methods, electromagnetic methods using chemi-ionization, and chemical exchange methods using liquid-liquid chromatography and complexing agents with particular tailor-made structures.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - M.A.D.

8.0018, VERY HIGH-TEMPERATURE REACTOR WITH APPLICATION FOR PROPULSION, PROCESS HEAT, AND ELECTRIC POWER
A.R. JONES, Westinghouse Electric Corp., *Pittsburgh, Pennsylvania* 15235

Description: System application studies for the very high-temperature reactor (VHTR) are emphasizing concept design and capability for use in propulsion systems, process systems, and electric power generation. Heat transfer surfaces and heat exchanger designs for use in systems with the gas-cooled reactor as a heat source are being evaluated. Development continues in the areas of critical components, safety, reliability, cost effectiveness, and maintainability. Specific systems for incorporating nuclear heat from the VHTR are being identified. Functional requirements are being defined for a specific nuclear system for a coal gasification process. A proprietary, highly efficient scheme has been analytically and experimentally developed that can produce hydrogen for use in many industrial applications such as steel making, ammonia production, and coal gasification. An experimental program to determine the effect of graphitizing, purification, and storage conditions on the residual gas content of graphite reactors is continuing. Fission product control through evaluation of fission product retention, plate-out, and clean-up is under way. The spin-off technology of the highly successful nuclear rocket program is the basis of these terrestrial applications.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - O.U.D.

8.0019, LIQUID METAL FAST BREEDED REACTOR - DEVELOPMENT AND FABRICATION OF ADVANCED FUELS
J.S. THEILACKER, Westinghouse Electric Corp., *Pittsburgh, Pennsylvania* 15235

Description: Fast reactor fuel development, up to the present date, has been directed to the mixed plutonium, uranium oxide system. Where this fuel material has merit, there is some question

as to its breeding characteristics. The effort carried by this program is directed to an alternate fuel-system--mixed plutonium, uranium carbide-- which has potential for improved breeding performance. Specifically, this program focused on the development of the facilities, equipment, materials, and processes for fabricating fuel components in which the alternate (advanced) fuel is employed. Facilities and equipment development covers the effort necessary to provide the means to fabricate the toxic, radioactive, and pyrophoric fuel materials; material development covers the effort necessary to identify the physical and mechanical properties of the fuel and structural materials; and process development covers the fabrication development required to convert the starting materials to finished fuel components. Components fabricated in years 1975 through 1977 will be performance tested in test reactor EBR-2; components fabricated after 1977 will be tested in the Fast Flux Test Facility.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - R.R.D.D.

8.0020, STUDIES OF MECHANICAL PROPERTIES AND IRRADIATION DAMAGE NUCLEATION OF HTGR GRAPHITES

P.A. THROWER, Penn. State University, School of Engineering, *University Park, Pennsylvania* 16802 (E(11-1)-2712)

This proposal is concerned with two aspects of the use of graphite as a moderator in high temperature gas-cooled reactors.

Earlier electron microscope studies suggest the possibility of some change in damage nucleation behavior in graphite in the irradiation temperature range 1200-1400 degrees centigrade. This may be reflected in property change measurements already available. Electron microscope studies of irradiated single crystals with different crystallite sizes and boron impurity contents are proposed which may illuminate this problem. Sample preparation and irradiation will be accomplished during the coming year.

Small amounts of water vapor and carbon monoxide in the helium coolant gas stream are of concern in that they react with the graphite. It is proposed to investigate the site on the specimen, and as a function of temperature and gas concentrations. The reaction rate will be determined by measuring the concentrations of CO and CO2 in the effluent gas usng non-dispersive infrared analyzers. Resulting changes in graphite compressive strength will also be measured. This work is of particular relevance to those graphite components such as the core support posts which are permanent fixtures in the reactor.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - P.R.D.

8.0021, DEVELOPMENT OF ADVANCED ISOTOPE SEPARATION TECHNIQUES

J.R. MORREY, Battelle Memorial Institute, *Richland, Washington* 99352

Description: The advanced isotope separation technology program is investigating and developing isotope separation techniques, other than gaseous diffusion or centrifuge, which have the potential of significantly reducing the cost of obtaining isotopic materials for a variety of uses. Program emphasis is placed upon the evaluation of alternative laser-induced uranium-235 separation techniques. These separation programs have the potential for providing significant long- term economic benefits to the civilian power market and to the AEC's weapons production program. The uranium separation effort is particularly important due to the fully committed status of current national enrichment capacity. A number of processes have been proposed for the laser photochemical separation of uranium isotopes. Two particular processes are being pursued through scientific and engineering feasibility experiments and one of these processes has been demonstrated on a laboratory scale basis. Other concepts being evaluated include aerodynamic methods,, electromagnetic methods using chemi-ionization, and chemical exchange methods using liquid-liquid chromatography and complexing agents with particular tailor-made structures.

SUPPORTED BY U.S. Energy Res. & Dev. Admin. - M.A.D.

SPACE SCIENCES

Includes Space Sciences (general); Astronomy; Astrophysics; Lunar and Planetary Exploration; Solar Physics; and Space Radiation. For Related Information See Also Geosciences.

10.0001, KIRUNA AURORAL INFRASOUND

C.R. WILSON, Univ. of Alaska, Geophysical Institute, *Fairbanks, Alaska* 99701 (GA-41918)

The Geophysical Institute of the University of Alaska at College, Alaska, and the Kiruna Geophysical Observatory of the Royal Swedish Academy of Sciences at Kiruna, Sweden, will make simultaneous observations at Kiruna of infrasonic waves from the aurora in two spectral regions: 1) at 2Hz, and 2) in the pass-band from 0.1 to 0.01Hz. The higher frequency observations of auroral infrasound are being made at Kiruna with two tripartite microphone arrays in a continuing program to study atmospheric infrasound that is supported by Sweden. The long period (10 to 100 sec) observations of auroral infrasonic waves (AIW) at Kiruna would be made with an infrasonic array that was just established at Kiruna under a grant from the National Science Foundation.

The purpose of the proposed experiment is to compare the characteristics of the high frequency auroral infrasound with those of the long period AIW bow waves generated by supersonic motions of auroral electrojet arcs. It is hoped to develop a comparative morphology of AIW and 2Hz auroral infrasound in order to determine whether the same generation mechanism is producing both types of infrasonic waves within the auroral substorm. From this information one can learn whether the coupling of energy from the auroral ionization to the neutral gas in the case of 2Hz infrasound is through the Lorentz Force interaction and Joule Heat loss of electrojet currents, as it is in the case of AIW bow waves. A quite different coupling mechanism such as direct heating by collisions from primary auroral electrons or the conversion of the ion- acoustic waves in radar auroras to acoustic waves at the base of the ionosphere may be producing the 2Hz auroral infrasound.

SUPPORTED BY U.S. Natl. Science Foundation

10.0002, ALASKAN INCOHERENT SCATTER RADAR INVESTIGATIONS OF THE HIGH LATITUDE IONOSPHERE

J.R. DOUPNIK, Univ. of California, School of Engineering, *San Diego, California* 92038 (GA-36281 01)

This research grant supports Alaskan incoherent scatter radar investigations at the high latitude ionosphere. This powerful technique involves the radar measurement of charged particle motions in the ionosphere. From these measurements, a large number of fundamental ionospheric and magnetospheric properties are calculated: electric fields, electron density profiles, electrical conductivity, plasma temperature, transverse currents, Joule heating rates, and E region neutral winds. These measurements have proven very valuable to our understanding of the coupling between the earth and its space environment.

SUPPORTED BY U.S. Natl. Science Foundation

10.0003, NEUTRON AND GAMMA-RAY FLUX IN THE ATMOSPHERE

J.A. LOCKWOOD, Univ. of New Hampshire, School of Liberal Arts, *Durham, New Hampshire* 03824 (GA-33858A1)

This grant supports a program to fly on a series of balloon flights a neutron and gamma-ray detector capable of measuring the fluxes, energy spectra, and angular distributions in the energy intervals from 2-50 MeV and 1-15 MeV respectively. The detector, which is being completed under a current NSF grant, uses a time at flight measurement between two banks of liquid scintillators. The goal of the research will be to understand better the source of energetic particles in the Van Allen belts.

SUPPORTED BY U.S. Natl. Science Foundation

10.0004, THEORETICAL AND EXPERIMENTAL STUDY OF THE LOWER D-REGION UTILIZING WAVE INTERACTION AND PARTIAL REFLECTION MEASUREMENTS

A.J. FERRARO, Penn. State University, School of Engineering, *University Park, Pennsylvania* 16802 (GA-41854)

This research program will utilize the radio wave interaction and partial reflection facilities at The Ionosphere Research Laboratory of Pennsylvania State University as well as those at The Arecibo Observatory of the National Astronomy and Ionosphere Center. The measurement program will emphasize the D-region below 70 km, a region where electron density profiles as obtained by different techniques do not agree. A cooperative program with The Naval Electronics Laboratory Center using VLV measurements will be carried out. Several aspects of partial reflection theory and measurements will be studied, in particular, the self-heating effect. Development of usable theoretical models of the D-region for the ion and neutral densities will be undertaken.

SUPPORTED BY U.S. Natl. Science Foundation

10.0005, IONOSPHERIC MODIFICATION EXPERIMENTS AT ARECIBO

W.E. GORDON, Rice University, Graduate School, *Houston, Texas* 77001 (GA-41670)

Irradiation of the ionosphere by high frequency radio waves provides a powerful technique in two areas of investigation, aeronomy and plasma physics. In the area of aeronomy collisional and other damping mechanisms will be studied at various heights as well as ion drifts. Temperature dependence of reaction rates associated with the emission of the red line airglow will be investigated. In the area of plasma physics the enhancement in the parametrically related plasma line of the electron gas and the acoustic line of the ion gas will be studied. The heating produces large enhancements of the plasma line and fluctuations on a wide variety of time scales related to the plasma dynamics. Interpretation of the observations and theoretical studies will be an integral part of the experiment.

SUPPORTED BY U.S. Natl. Science Foundation

10.0006, RADIATIVE AND DYNAMIC INTERACTIONS IN THE POLLUTED PLANETARY BOUNDARY LAYER

W.G. ZDUNKOWSKI, Univ. of Utah, School of Mines & Mineral Ind., *Salt Lake City, Utah* 84112 (GA-42559)

The purpose of this research is to carry out a theoretical- numerical study of the effect of air pollution upon the temperature and wind distribution of the atmospheric boundary layer. The investigation will contain a rather sophisticated treatment of radiative transfer since dynamical processes in the boundary layer are strongly dependent upon radiative interactions with particulate matter and absorbing gases. The formulation of radiative transfer contains a complete treatment of the absorption and multiple scattering by particles and air molecules. In addition to the ever-present gases, water vapor, carbon dioxide and ozone, the effects of the pollutant gases SO2 and NO2 will also be included.

The dynamical treatment of the proposed research will use the most up-to-date numerical schemes. While previously developed one- dimensional models give better than qualitative insight, this study will include the major effects of horizontal variations. In addition, the most recent and complete formulations of the turbulent transfer coefficients will be examined and applied within the framework of this proposed research.

SUPPORTED BY U.S. Natl. Science Foundation

VOLUME 13 NUMBER 20 / OCTOBER 23, 1975

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N75-29001*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
NASA/UNIVERSITY CONFERENCE ON AERONAUTICS
Washington 1975 430 p refs Conf. held at Lawrence, Kans., 23-24 Oct. 1974
(NASA-SP-372; L-10142; LC-75-600023) Avail: NTIS HC $10.50 CSCL 01B

The proceedings of a conference on the future of aeronautics are presented. The subjects discussed include the following: (1) aeronautics and the education of the engineer, (2) technical trends in aeronautics, and (3) the role of the university in aeronautics. The technical trends in aeronautics are concerned with aircraft noise control, the effect of the aircraft on the environment, airborne electronics for automated flight, and trends in aircraft design. For individual titles, see N75-29002 through N75-29025.

N75-29002* National Aeronautics and Space Administration, Washington, D.C.
AERONAUTICS IN THE AMERICAN SOCIETY
James C. Fletcher *In its* NASA/Univ. Conf. on Aeron. 1975 p 1-10 (For availability see N75-29001 20-01)
CSCL 01B

The trends in aeronautics and aeronautical education are discussed with respect to the roles of industry, government, and the universities. The importance of the aviation industry to the economy of the country is examined. The impact of reduced enrollment of aeronautical engineering students in the universities on the future of the aeronautical industry is stressed. It is stated that the role of the government should be to sponsor and conduct basic research and advanced technology programs for civil and military aviation, and the specification, development, procurement, and operation of military aircraft. Recommendations are made for approaches which may be taken to influence more qualified students to enter the field of aeronautics. Author

N75-29003* Princeton Univ., N.J.
SOME DEVELOPING CONCEPTS OF ENGINEERING EDUCATION c80
Courtland D. Perkins *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 11-24 (For availability see N75-29001 20-01)
CSCL 05I

An analysis of the circumstances which have created a shortage of aeronautical engineering undergraduate students in the universities is presented. Suggestions for motivating students to enter aeronautical engineering are examined. The support of the aeronautical industry for graduate education funding is recommended. Examples of actions taken by governmental agencies to promote increased interest in aeronautical engineering are included. Author

N75-29004* McDonnell-Douglas Corp., St. Louis, Mo.
CURRENT AND FUTURE OPPORTUNITIES IN AERONAUTICAL ENGINEERING c80
J. C. Brizendine *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 25-60 (For availability see N75-29001 20-01)
CSCL 05C

Current demand for aeronautical engineers is approximately balanced with supply, with some shortfall in certain specialties. In the near term (5 years), demand will exceed supply of new graduates. A number of factors have brought on the state of imbalance: (1) the cyclic nature of the demand of our defense requirements; (2) drastic changes in DOD aircraft procurement; (3) the emergence of the space age; (4) evolution of social attitudes toward technology with resultant decline in enrollments; and (5) the universities themselves through their influences in the direction of careers selected by engineers. These factors have been counteracted somewhat by increased DOD emphasis on aircraft development programs but more importantly by the favorable growth in civil aircraft requirements. Author

N75-29005* Stanford Univ., Calif.
THE PREDICAMENT OF AERONAUTICAL ENGINEERING EDUCATION AND WHAT WE CAN DO ABOUT IT c80
Arthur E. Bryson, Jr. *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 61-64 (For availability see N75-29001 20-01)
CSCL 05I

An analysis of the aeronautical engineering situation and the relationship to the U.S. aircraft industry is presented. Some of the problems encountered in undergraduate aeronautical engineering education are explained. A reorganization of the educational structure for aeronautical engineering is proposed. The human factors aspect of aeronautical engineering discipline is described. Author

N75-29006* Washington Univ., Seattle.
THE PREDICAMENT OF AERONAUTICAL ENGINEERING EDUCATION AND WHAT WE CAN DO ABOUT IT c80
R. J. H. Bollard *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 65-70 (For availability see N75-29001 20-01)
CSCL 05I

Problems faced by the universities due to the drop in enrollment of aeronautics and astronautics undergraduate students are examined. Efforts made by the universities to overcome some of these problems are discussed. The author presents ten specific recommendations involving government and industry support to overcome the apparent lack of interest in engineering disciplines. Author

N75-29007* Lockheed Aircraft Corp., Sunnyvale, Calif.
THE NEXT FORTY YEARS IN AVIATION
Willis M. Hawkins *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 71-102 (For availability see N75-29001 20-01)
CSCL 01B

A prediction of the status of various types of aviation

activities which may be expected in twenty years is presented. The basic assumptions are that the population of the nation will continue to grow at more than 7 percent and that the need for air transportation of passengers and cargo will increase accordingly. Various predictions are also made for the developments in vertical takeoff aircraft, short haul airline operations, general aviation, and military aircraft. Areas of improvement are indicated for air navigation, air traffic control, night vision, quiet aircraft, and the use of hydrogen as a fuel. Author

N75-29008* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
TRENDS IN AIRCRAFT NOISE CONTROL c07
Harvey H. Hubbard and Earl W. Conrad *In its* NASA/Univ. Conf. on Aeron. 1975 p 103-130 refs (For availability see N75-29001 20-01)
CSCL 01C

Flight vehicles are characterized according to their manner of operation and type of propulsion system; and their associated sources of noise are identified. Available noise reduction technology as it relates to engine cycle design and to powerplant component design is summarized. Such components as exhaust jets, fans, propellers, rotors, blown flaps, and reciprocating-engine exhausts are discussed, along with their noise reduction potentials. Significant aircraft noise reductions are noted to have been accomplished by the application of available technology in support of noise certification rules. Further noise reductions to meet more stringent future noise regulations will require substantial additional technology developments. Improved analytical prediction methods, and well-controlled validation experiments supported by advanced-design aeroacoustic facilities, are required as a basis for an effective integrated systems approach to aircraft noise control. Author

N75-29009* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ASSESSING AND CONTROLLING THE EFFECT OF AIRCRAFT ON THE ENVIRONMENT: POLLUTION c45
I. G. Poppoff and J. S. Grobman *In its* NASA/Univ. Conf. on Aeron. 1975 p 131-142 (For availability see N75-29001 20-01)
CSCL 13B

The air pollution created by aircraft engines around airports and the global atmospheric problem of supersonic aircraft operating in the stratosphere are discussed. Methods for assessing the air pollution impact are proposed. The use of atmospheric models to determine the air pollution extent is described. Methods for controlling the emissions of aircraft engines are examined. Diagrams of the atmospheric composition resulting from exhaust gas emissions are developed. Author

N75-29010* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ON WAKE VORTEX ALLEVIATION c02
Leonard Roberts *In its* NASA/Univ. Conf. on Aeron. 1975 p 143-168 refs (For availability see N75-29001 20-01)
CSCL 01A

Research within NASA relating to the nature of lift-induced vortex wakes behind large aircraft and the means whereby the hazard they represent to smaller aircraft can be alleviated is reviewed. The research, carried out in ground based facilities and in flight shows that more rapid dispersion of the wake can be effected by several means and that the modification of span-loading by appropriate flap deflection holds promise of early practical application. Author

N75-29011* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AIRBORNE ELECTRONICS FOR AUTOMATED FLIGHT SYSTEMS c06
George B. Graves, Jr. *In its* NASA/Univ. Conf. on Aeron. 1975 p 169-182 refs (For availability see N75-29001 20-01)
CSCL 01D

The increasing importance of airborne electronics for use in automated flight systems is briefly reviewed with attention to both basic aircraft control functions and flight management systems for operational use. The requirements for high levels of systems reliability are recognized. Design techniques are discussed and the areas of control systems, computing and communications are considered in terms of key technical problems and trends for their solution. Author

N75-29012* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE LONG TERM ENERGY PROBLEM AND AERONAUTICS c44
Richard A. Rudey *In its* NASA/Univ. Conf. on Aeron. 1975 p 183-210 refs (For availability see N75-29001 20-01)
CSCL 10B

The projected increase in energy consumption by transportation in general and civil aviation in particular is directly opposed to the dwindling supplies of natural petroleum crude oil currently used to produce aircraft fuels. This fact dictates the need to develop even more energy conservative aircraft and propulsion systems than are currently available and to explore the potential of alternative fuels to replace the current petroleum derived hydrocarbons. Advances in technology are described in the areas of improved component efficiency, aircraft and engine integration, control systems, and advanced lightweight materials that are needed to maximize performance and minimize fuel usage. Also, improved turbofan and unconventional engine cycles which can provide significant fuel usage reductions are described. These advancements must be accomplished within expected environmental constraints such as noise and pollution limits. Alternative fuels derived from oil shale and coal are described, and the possible technological advancements needed to use these fuels in aircraft engines are discussed and evaluated with relation to potential differences in fuel characteristics. Author

N75-29013* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPUTATIONAL AERODYNAMICS c02
Dean R. Chapman *In its* NASA/Univ. Conf. on Aeron. 1975 p 211-212 (For availability see N75-29001 20-01)
CSCL 01B

The application of computer techniques for solving Navier-Stokes equations in support of wind tunnel tests is discussed. The ILLIAC IV computer is considered for this purpose and its limitations are analyzed. The author states that improved computers will make it possible to solve many aerodynamic problems and reduce the amount of wind tunnel testing required for adequate data processing. Author

N75-29014* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
SOME TRENDS IN AIRCRAFT DESIGN: STRUCTURES c05
George W. Brooks *In its* NASA/Univ. Conf. on Aeron. 1975 p 213-272 refs (For availability see N75-29001 20-01)
CSCL 01C

Trends and programs currently underway on the national scene to improve the structural interface in the aircraft design process are discussed. The National Aeronautics and Space Administration shares a partnership with the educational and industrial community in the development of the tools, the criteria, and the data base essential to produce high-performance and cost-effective vehicles. Several thrusts to build the technology in materials, structural concepts, analytical programs, and integrated design procedures essential for performing the trade-offs required to fashion competitive vehicles are presented. The application of advanced fibrous composites, improved methods for structural analysis, and continued attention to important peripheral problems of aeroelastic and thermal stability are among the topics considered. Author

N75-29015* National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
STATUS AND TRENDS IN ACTIVE CONTROL TECHNOLOGY c08
Herman A. Rediess and Kenneth J. Szalai *In its* NASA/Univ. Conf. on Aeron. 1975 p 273-322 refs (For availability see N75-29001 20-01)
CSCL 01C

The emergence of highly reliable fly-by-wire flight control systems makes it possible to consider a strong reliance on automatic control systems in the design optimization of future aircraft. This design philosophy has been referred to as the control

configured vehicle approach or the application of active control technology. Several studies and flight tests sponsored by the Air Force and NASA have demonstrated the potential benefits of control configured vehicles and active control technology. The present status and trends of active control technology are reviewed and the impact it will have on aircraft designs, design techniques, and the designer is predicted. Author

N75-29016* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
OPPORTUNITIES FOR AERODYNAMIC-DRAG REDUCTION c05
Robert E. Bower *In its* NASA/Univ. Conf. on Aeron. 1975 p 323-352 refs (For availability see N75-29001 20-01)
CSCL 01C

Methods for reducing aerodynamic drag to improve aircraft performance and reduce fuel consumption are discussed. The techniques considered are: (1) pressure drag reduction, (2) supercritical airfoils, (3) subcritical airfoils, (4) induced drag reduction by over-the-wing blowing and increased aspect ratio, and (5) friction drag reduction by laminar flow control and slot injection. It is stated that a 50 percent reduction from current drag values is expected through the application of these techniques. Author

N75-29017* Kansas Univ., Lawrence.
THE ME/DE DEGREE AT THE UNIVERSITY OF KANSAS c80
Kenneth H. Lenzen *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 353-356 (For availability see N75-29001 20-01)
CSCL 05I

An effort to provide advanced engineering education for aeronautical engineers is discussed. The Doctor of Engineering program involves a technical education in the area of interest above that of the M.S. degree. In addition, there is a core of systems, design, business, and technology and society courses which all students must take. Twenty-four hours are required in the core area. The original courses as modified with time still exist. A recent review has indicated a need for change. The core will remain, but it is the hope that the student will have a selection of 30 hours in these areas from which to pick 24 hours. The areas will be changed such that system analyses and design will be integrated to a further extent. The business area will be expanded. Areas such as technology assessment and forecasting will be added. Author

N75-29018* Iowa State Univ. of Science and Technology, Ames.
A PROPOSED UNIVERSITY/INDUSTRY/GOVERNMENT COOPERATIVE AERO EDUCATIONAL PROGRAM c80
Robert F. Brodsky *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 357-368 ref (For availability see N75-29001 20-01)
CSCL 05I

A program is proposed to provide mutual aid between the beleaguered Aero Engineering degree-granting departments in the United States and United States industry/government. It is proposed that any accrued cost differentials be supported by the latter groups, although all programs proposed will provide true mutual assistance. The program suggested is designed to provide assured industrial experience for Aero faculty members, combat engineering obsolescence for industry engineers, provide assured summer work for Aero undergraduates, encourage industry/government input in curriculum and course planning, and funnel significant laboratory devices into the university system. Author

N75-29019* Boeing Co., Seattle, Wash.
UNIVERSITY/GOVERNMENT/INDUSTRY RELATIONS IN AERONAUTICS c80
George S. Schairer *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 369-372 (For availability see N75-29001 20-01)
CSCL 01B

Methods for improving the relationships between universities, the aircraft industry, and the Government are proposed. The author submits nine specific recommendations aimed at more effective aeronautical engineering education and employment of graduate engineers. The need for improved communication between the organizations which influence the advancement of aeronautical sciences is stressed. Author

N75-29020* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
UNIVERSITY RESEARCH IN AERONAUTICS
John E. Duberg *In its* NASA/Univ. Conf. on Aeron. 1975 p 375-378 (For availability see N75-29001 20-01)
CSCL 01B

The contributions which universities can make to aeronautical research projects are discussed. The activities of several facilities are presented to show the effectiveness of the educational and research programs. Reference is made to the Intergovernmental Personnel Act of 1970 which permits an exchange of federal agency personnel with state and local governments and with public and private higher education schools. Author

N75-29021* Cessna Aircraft Co., Wichita, Kans.
GENERAL AVIATION'S FUTURE NEED FOR RESEARCH
Malcolm Harned *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 379-380 (For availability see N75-29001 20-01)
CSCL 01B

The research requirements for general aviation aircraft are presented. Emphasis is placed on improving the performance of airfoils, propellers, and engines. Additional requirements are expressed with respect to external noise reduction, internal noise reduction, and exhaust emission control. The requirement for anti-icing developments to create improved flight safety is discussed. Author

N75-29022* Stanford Univ., Calif.
UNIVERSITY RESEARCH IN AERONAUTICS
Holt Ashley *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 381-383 (For availability see N75-29001 20-01)
CSCL 01B

The types of aeronautical research projects which universities should and should not accept for Government and industry are discussed. Specific examples of suitable and unsuitable research projects are presented. The author recommends two modes by which universities can be of assistance to other organizations in aeronautical research. Author

N75-29023* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CURRICULUM FOR MODERN AERONAUTICS c80
Leonard Roberts *In its* NASA/Univ. Conf. on Aeron. 1975 p 389-392 (For availability see N75-29001 20-01)
CSCL 05I

Methods for improving the university training of aeronautical engineering students are discussed. Specific topics considered are: (1) the kind of students which should be developed through aeronautical engineering education, (2) to what extent should aerospace engineering be prepared for diversity and change, (3) to what extent should theory be emphasized as compared with practical engineering and design, and (4) a suggestion for NASA/Industry/University collaboration. Author

N75-29024* Massachusetts Inst. of Tech., Cambridge.
ENGINEERING EDUCATION FOR THE 1980'S: A SPECULATION c80
Eugene E. Covert *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 393-401 (For availability see N75-29001 20-01)
CSCL 05I

The development of a course of study is briefly examined from two points of view. The first represents the background that would seem to be needed for a fledgling engineer upon his entry into the engineering profession and would allow him to complete successfully his on-the-job training, or engineering internship as it were. The second represents that which must be provided on the basis of the students background from secondary school. It is suggested that a course of study viewed in this way is never fixed, but rather evolves continuously. A particular evolving course of study is briefly discussed. Author

N75-29025* Boeing Co., Seattle, Wash.
WHAT KIND OF STUDENTS SHOULD BE DEVELOPED THROUGH AERONAUTICAL ENGINEERING EDUCATION? **c80**
Richard B. Holloway *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 403-410 refs (For availability see N75-29001 20-01)
CSCL 05I

The educational requirements for future aeronautical engineering students are postulated. The change in aeronautical engineering from increasing aircraft performance without regard to cost is compared with the cost effective aspects of future research. The capabilities of future engineers are discussed with respect to the following areas: (1) problem solving, (2) planning and organizing, (3) communication, and (4) professionalism. Author

N75-29026# National Aerospace Lab., Tokyo (Japan).
EFFECTS OF REYNOLDS NUMBER AND ROUGHNESS ON C SUB Lmax
Nobuhiko Kamiya, Masayoshi Nakamura, Tadashi Itoh, Hirotaka Itabashi, and Miyuki Nomura Dec. 1974 12 p refs In JAPANESE; ENGLISH summary
(NAL-TR-396) Avail: NTIS HC $3.25

Maximum lift coefficient is one of the aerodynamic characteristics of a wing which it is very difficult to estimate from experimental data. It is observed in various experiments that C sub Lmax increases with increasing Reynolds number. As Reynolds number increases the drag of a circular cylinder first decreases to a minimum value and then increases again to some constant value due to the corresponding movement of the separation point of the boundary layer. C sub Lmax of an airfoil depends strongly on the location of the separation point, which is considered to move backward first and then forward as Reynolds number increases similarly to the case of the circular cylinder. Therefore, it may be considered that C sub Lmax increases first to a maximum value and then decreases. In order to verify this presumption, a preliminary experiment was made in a simple experimental setup with a two dimensional model, composed of a circular cylinder and a flap of Thwaites' type at Reynolds numbers ranging from 4 x 10,000 to 4 x 100,000. It is demonstrated that C sub Lmax of this model behaved as expected. Author

N75-29027# National Aerospace Lab., Tokyo (Japan).
MEASUREMENT AND ANALYSIS OF UNSTEADY AERODYNAMIC FORCE FOR THE VERTICAL GUST ON AN AIRPLANE MODEL IN THE NAL GUST WIND TUNNEL
Hiroshi Nishimura, Hiroshi Matsushita, Kiyomi Kitamura, and Yoshitaka Murakami Jan. 1975 16 p refs In JAPANESE; ENGLISH summary
(NAL-TR-399) Avail: NTIS HC $3.25

A vertical gust aerodynamic force study in a gust wind tunnel which has a 2 meter squared section and gust generation cascades, is reported. Sinusoidal and random gusts of about 1 meter per sec. vertical amplitude are applied on a semi rigid model of about 1.4 meter span fixed at the middle of the test section. Longitudinal tunnel flow is fixed at 20 meter per sec. and experimental frequencies are 0.2 to 10 Hz. Parts of data are compared with theoretical calculation for tapered three dimensional wings. Results show wing/body/tail interferences for the complete, tailless and wingless configurations. Author

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

N75-29028+ Engineering Sciences Data Unit, London (England).
INFORMATION ON THE USE OF DATA ITEMS IN THE SERIES BODIES 02.04
Dec. 1971 1 p
(ESDU-02.04.00) Copyright. Avail: NTIS HC $7.50

Data items (DI) for calculating the drag of streamline bodies at small angles of incidence are listed along with those DI which have information concerning the permissible limits of roughness inlaminar flow. The DI which discusses the application of data dealing with drag increase due to roughness is also given. Author

N75-29029+ Engineering Sciences Data Unit, London (England).
TRANSONIC DATA MEMORANDUM: SECOND-ORDER METHOD FOR ESTIMATING THE SUBCRITICAL PRESSURE DISTRIBUTION ON A TWO-DIMENSIONAL AEROFOIL IN COMPRESSIBLE INVISCID FLOW
Dec. 1973 22 p refs
(ESDU-72025) Copyright. Avail: NTIS HC $122.50

A method is presented, accurate to second-order in thickness, camber and incidence, for estimating the subcritical pressure distribution on a two-dimensional aerofoil in compressible inviscid flow. A few examples are given of comparisons with a nominally-exact method and it is shown how the method differs from a first-order method widely used as the basis for the calculation of pressure distributions on finite swept wings and on two-dimensional aerofoils in compressible viscous flow. A critical evaluation of the second-order method has shown that over a wide range of aerofoil shapes, incidence and Mach number, pressure distributions calculated by the second-order method differ appreciably from nominally-exact calculations only for local regions of aerofoils where high local surface curvature occurs and over the first 20 per cent, or so, of chord for aerofoils having the bluffer leading-edge profiles. Two suggested techniques for enumerating the method are outlined and reference is made to a computer program which was used to obtain results from the method. Author

N75-29030*# Aerophysics Research Corp., Bellevue, Wash.
THEORETICAL EFFECT OF MODIFICATIONS TO THE UPPER SURFACE OF TWO NACA AIRFOILS USING SMOOTH POLYNOMIAL ADDITIONAL THICKNESS DISTRIBUTIONS WHICH EMPHASIZE LEADING EDGE PROFILE AND WHICH VARY LINEARLY AT THE TRAILING EDGE
Donald S. Hague and Antony W. Werz Mar. 1975 32 p refs
(Contract NAS2-8599)
(NASA-CR-137717; TN-197) Avail: NTIS HC $3.75 CSCL 01A

An investigation was conducted on a CDC 7600 digital computer to determine the effects of additional thickness distributions to the upper surface of airfoils. The additional thickness distribution had the form of a continuous mathematical function which disappears at both the leading edge and the trailing edge. Results were obtained at a Mach number of 0.2 with an angle of attack of 6 deg. All calculations employed the full potential flow equations for two dimensional flow. The relaxation method of Jameson was used for solution of the potential flow equations. It is shown that increasing the thickness and variations in shape increases the lift and the adverse pitching moment coefficients. Author

N75-29031*# Pennsylvania State Univ., University Park.
UNSTEADY VORTEX LATTICE TECHNIQUES APPLIED TO WAKE FORMATION AND PERFORMANCE OF THE STATICALLY THRUSTING PROPELLER
Gerald Forrest Hall [1975] 197 p refs
(Grant NGL-39-009-172)
(NASA-CR-132686) Avail: NTIS HC $7.00 CSCL 01A

The application is considered of vortex lattice techniques to the problem of describing the aerodynamics and performance of statically thrusting propellers. A numerical lifting surface theory to predict the aerodynamic forces and power is performed. The chordwise and spanwise loading is modelled by bound vortices fixed to a twisted flat plate surface. In order to eliminate any apriori assumptions regarding the wake shape, it is assumed the propeller starts from rest. The wake is generated in time and allowed to deform under its own self-induced velocity field as the motion of the propeller progresses. The bound circulation distribution is then determined with time by applying the flow tangency boundary condition at certain selected control points on the blades. The aerodynamics of the infinite wing and finite wing are also considered. The details of wake formation and roll-up are investigated, particularly the localized induction effect. It is concluded that proper wake roll-up and roll-up rates can

be established by considering the details of motion at the instant of start. Author

N75-29032# National Aerospace Lab., Tokyo (Japan).
SHEAR AND MOMENT RESPONSE OF THE AIRPLANE WING TO NONSTATIONARY TURBULENCE
Yoshinori Fujimori Jan. 1975 13 p refs
(NAL-TR-404T) Avail: NTIS HC $3.25

Response formulation of the shear force and bending moment of the airplane wing was established in terms of evolutionary cross spectrum. Frequency distribution of the responses of arbitrary wing sections can be obtained at any time instant of interest after the airplane enters the nonstationary atmospheric turbulence. Conventional stationary solutions are included in this analysis as the special case. Contribution by the pitching motion is the highest to both shear amd moment responses. The effect of the shear force to the stress level is negligibly smaller than that due to the bending moment. When the envelope profile looks like a step function, mean square moment takes the maximum in the transient stage whose spectrum is dominated by rigid modes. But the spectrum at stationary state, where its mean square moment is lower that the transient maximum, shows both rigid and flexible motions. Therefore, the search of the stationary solutions only is not adequate in view of ultimate strength and fatigue life of the airplane structure. Author

N75-29033*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A NUMERICAL DETERMINATION OF THE BOW SHOCK WAVE IN TRANSONIC AXISYMMETRIC FLOW ABOUT BLUNT BODIES
D. J. Jones (Natl. Aeron. Estab., Ottawa) and J. C. South, Jr. Ottawa Natl. Res. Council May 1975 56 p refs
(NASA-TM-X-72448; ISSN-0077-5541; NRC-14765; LR-586) Avail: NTIS HC $4.25 CSCL 01/1

A numerical method was developed for calculating axisymmetric transonic (M greater than 1) flow about a blunt body; the bow shock wave location was investigated. A Rankine-Hugoniot jump was applied at the shock while relaxation on the isentropic equation of motion was used between shock and body. The shock wave is adjusted by a Newton type iteration scheme. Results are given for a sphere in the Mach number range 1.62 down to 1.02. Author

N75-29034# Aeronautical Research Labs., Melbourne (Australia).
HIGHER ORDER WIND TUNNEL CORRECTIONS FOR A TWO-DIMENSIONAL CIRCULAR ARC LIFTING AEROFOIL IN A CLOSED RECTANGULAR WIND TUNNEL
B. W. B. Shaw Aug. 1974 69 p refs
(ARL/A-Note-349) Avail: NTIS HC $4.25

A method is presented for solving the inviscid flow past a two-dimensional airfoil in a closed rectangular wind tunnel by determining an equivalent free-air flow field containing an independent vortex. Expressions for the tunnel corrections to the incidence and free-stream speed, and C sub L, C sub D, and C sub m are given for an infinitely thin circular arc cambered airfoil as quadratics in cord/tunnel height ratio (c/h). With centrally positioned airfoils, for values of c/h up to 0.3 first order theory predicts all the corrections with generally good accuracy (within 1/2% of the corrected quantity), except for delta C sub D near the stall. But for airfoils with even a small vertical offset, for the corrections to C sub L, C sub D, and C sub m, first order theory proves inaccurate, and the higher order equations should be used. Author

N75-29035*# Kanner (Leo) Associates, Redwood City, Calif.
EXPERIMENTAL AND THEORETICAL INVESTIGATIONS ON THE PROBLEM OF PROPELLER/WING INTERFERENCE UP TO HIGH ANGLES OF ATTACK
B. Straeter Washington NASA Aug. 1975 161 p refs Transl. into ENGLISH of "Experimentelle und theoretische Untersuchungen zum Problem der Propeller-Fluegel-Interferenz bis zu Hoch Anstellwinkeln", Rept. IFD-5/73 Technische Hochschule, Darmstadt, West Ger., 20 Dec. 1973 181 p
(Contract NASw-2970)
(NASA-TT-F-16490; IFD-5/73) Avail: NTIS HC $6.25 CSCL 01A

Propeller wing interactions for variable propeller modulus and variable propeller wing distances were measured on a model during wind tunnel tests. Procedures for calculating wing coefficients and for the determination of the total force coefficients of propeller wing configurations were developed. Theoretical procedures are in good agreement with experimental results. Author

N75-29036*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
EFFORT OF SPANWISE VARIATION OF TURBULENCE ON THE NORMAL ACCELERATION OF AIRPLANES WITH SMALL SPAN RELATIVE TO TURBULENCE SCALE
Kermit G. Pratt Aug. 1975 37 p refs
(NASA-TM-X-72748) Avail: NTIS HC $3.75 CSCL 01A

A rigid airplane with an unswept wing is analyzed. The results show that the power spectrum, relative to that for a one-dimensional turbulence field, is significantly attenuated at the higher frequencies even for airplanes with arbitrarily small ratios of span to scale of turbulence. This attenuation is described by a simple weighting function of frequency that depends only on aspect ratio. The weighting function, together with the attenuation due to the unsteady flow of gust penetration, allows the determination of the average rate of zero crossings for airplanes having very small spans without recourse to an integral truncation which is often required in calculations based on a one-dimensional turbulence field. Author

N75-29037*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
VIBRATIONS MEASURED IN THE PASSENGER CABINS OF TWO JET TRANSPORT AIRCRAFT
John J. Catherines, John S. Mixson, and Harland F. Scholl Washington Aug. 1975 55 p refs
(NASA-TN-D-7923; L-9531) Avail: NTIS HC $4.25 CSCL 05H

Accelerations in the lateral and vertical directions were measured at two locations on the floor of a three-jet-engine aircraft and at two locations on the floor of a two-jet-engine aircraft during a total of 13 flights, each of which included taxiing, takeoff, ascent, cruise, descent, and landing. Accelerations over the frequency range 0 to 25 Hz were recorded continuously on magnetic tape and were synchronized with the VGH recorders in the aircraft so that vibratory accelerations could be correlated with the operating conditions of the aircraft. From the results it was indicated that the methodology used in segmenting the data, which were obtained in a continuous and repetitive manner, contributes to establishing baseline data representative of the flight characteristics of aircraft. Significant differences among flight conductions were found to occur. The lateral accelerations were approximately 15 percent of the vertical accelerations during flight but as much as 50 to 100 percent of the vertical accelerations during ground operations. The variation between the responses of the two aircraft was not statistically significant. The results also showed that more than 90 percent of the vibratory energy measured during flight occurred in the 0- to 3.0-Hz frequency range. Generally, the vibration amplitudes were normally distributed. Author

N75-29038*# Iowa State Univ. of Science and Technology, Ames. Engineering Research Inst.
NUMERICAL COMPUTATION OF THREE-DIMENSIONAL BLUNT BODY FLOW FIELDS WITH AN IMPINGING SHOCK
Interim Report
Terry L. Holst and John C. Tannehill Jul. 1975 169 p refs
(Grant NGR-16-002-038)
(NASA-CR-143312; ISU-ERI-Ames-75169) Avail: NTIS HC $6.25 CSCL 01A

A time-marching finite-difference method was used to solve the compressible Navier-Stokes equations for the three-dimensional wing-leading-edge shock impingement problem. The bow shock was treated as a discontinuity across which the exact shock jump conditions were applied. All interior shock layer detail such as shear layers, shock waves, jets, and the wall boundary layer were automatically captured in the solution. The impinging shock was introduced by discontinuously changing the freestream conditions across the intersection line at the bow shock. A special storage-saving procedure for sweeping through the finite-difference mesh was developed which reduces the required amount

of computer storage by at least a factor of two without sacrificing the execution time. Numerical results are presented for infinite cylinder blunt body cases as well as the three-dimensional shock impingement case. The numerical results are compared with existing experimental and theoretical results. Author

N75-29039*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
EXTRACTION FROM FLIGHT DATA OF LONGITUDINAL AERODYNAMIC COEFFICIENTS IN MANEUVERING FLIGHT FOR F-8C AIRCRAFT
William T. Suit Washington Aug. 1975 41 p refs
(NASA-TN-D-8019; L-10026) Avail: NTIS HC $3.75 CSCL 01A

Flight-test data were used to extract the longitudinal aerodynamic parameters of the F-8C aircraft. The aircraft was trimmed in a steady turn at angles of attack of approximately 9 deg and 13 deg at Mach numbers of 0.7 and 0.8. The parameters extracted resulted in a good match to the flight data and the values obtained were reasonable. The values were further verified by comparing the period and time to damp to half-amplitude, as calculated by using the extracted parameter values, with the period and time to damp to half-amplitude actually measured from the flight data traces. These results show that for the set of data examined, a mathematical model using linear aerodynamics was adequate to describe the response motions at the test angles of attack. Author

N75-29040# Cambridge Univ. (England). Dept. of Engineering.
THE EFFECT OF COMPRESSIBILITY ON UNSTALLED TORSIONAL FLUTTER
D. S. Whitehead London Aeron. Res. Council 1974 21 p refs Supersedes ARC-35018 Sponsored by Min. of Defence
(ARC-R/M-3754; ARC-35018) Avail: NTIS HC $3.25; HMSO £1.20; PHI $4.90

Results are presented of calculations of torsional flutter of unstalled cascade blades at zero mean deflection and subsonic Mach numbers. Three kinds of flutter were found. Subcritical flutter occurs when no acoustic waves can propagate in the duct. The effect of increasing Mach number is highly favorable, and tends to suppress the flutter predicted by incompressible theory. Acoustic resonance flutter occurs when the blade frequency is slightly less than the acoustic resonant frequency of the upstream and downstream ducts. It is critically dependent on this coincidence, and would give small areas of flutter on a compressor performance map. Supercritical flutter occurs when some acoustic waves can propagate in the duct; it only occurs at Mach numbers close to unity. Author (ESRO)

N75-29041# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
SOME UNSEPARATED BASE FLOWS WITH HEAT ADDITION
E. G. Broadbent London Aeron. Res. Council 1974 15 p refs Supersedes RAE-TR-73094; ARC-34954
(ARC-R/M-3756; RAE-TR-73094; ARC-34954) Avail: NTIS HC $3.25; HMSO 86P; PHI $3.65

Analytical solutions are derived for a class of axisymmetric base flows with heat addition. The assumed upstream conditions are nonuniform in velocity and temperature, which vary with r in spherical polar coordinates (r, theta, phi) in a prescribed manner such that pressure and Mach number are independent of r. The turning flow expands about the base axisymmetrically and without change in r-dependence, so that the flow is self-similar with respect to conical surfaces of constant theta. The magnitude and distribution of heat addition is calculated, and results are given for a few examples. Author (ESRO)

N75-29042# Salford Univ. (England). Fluid Mechanics Computation Centre.
A FORM OF THE SUPERSONIC FLOW EQUATIONS FOR AN IDEAL GAS
F. Walkden London Aeron. Res. Council 1974 19 p refs Supersedes ARC-34160
(ARC-R/M-3757; ARC-34160) Avail: NTIS HC $3.25; HMSO £1.10; PHI $4.30

Nonlinear partial differential equations are derived which govern the steady supersonic three-dimensional flow of an inviscid ideal gas with constant specific heats in an arbitrary curvilinear coordinate space. A special form of these equations was constructed for the case when two families of stream surfaces and one family of parallel planes are used as coordinates. Characteristic equations equivalent to this special form were obtained. The characteristic equations are suitable for numerical integration of the equations of motion to obtain solutions of mixed initial and boundary value problems. The characteristic equations are a generalized form of similar equations used by Walkden and Caine as the basis of a numerical method for calculating supersonic two-dimensional and axisymmetric flow fields. Author (ESRO)

N75-29043# Royal Aircraft Establishment, Teddington (England). Aerodynamics Dept.
THE PREDICTION OF BOUNDARY-LAYER BEHAVIOR AND PROFILE DRAG FOR INFINITE YAWED WINGS. PART 2: FLOW NEAR A TURBULENT ATTACHMENT LINE
B. G. J. Thompson London Aeron. Res. Council 1974 46 p refs Supersedes RAE-TR-73091; ARC-35095
(ARC-CP-1308; RAE-TR-73091; ARC-35095) Avail: NTIS HC $3.75; HMSO £1.10; PHI $4.30

Calculations, using the entrainment method Thompson and MacDonald show that, even at flight Reynolds numbers, a conventional swept wing with turbulent attachment line flow is affected by a prolonged region of reverse transition. Simple assumptions were used to estimate the effect of this on boundary-layer development. It is found that the profile drag is affected by several per cent, and it is thought that the shock-induced separation and scale effects for 'peaky' transonic airfoils would be even more susceptible to the presence of laminar reversion, and that the use of an attachment line criterion for turbulent flow (such as C^*) is inadequate on its own. Calculations using the same boundary-layer method were made to provide charts from which a basic experiment at low speeds can be designed to investigate these problems on a yawed circular cylinder. Author (ESRO)

N75-29044# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
A NUMERICAL METHOD FOR THE SOLUTION OF THE TWO-DIMENSIONAL STEADY LAMINAR BOUNDARY LAYER EQUATIONS
Michael T. Hill and H. J. Wirz Nov. 1974 57 p refs Sponsored in part by UK Min. of Defence
(VKI-TN-103) Avail: NTIS HC $4.25

The method described applies to calculations for both incompressible and compressible flows with any pressure gradient and Mach number. It involves splitting the diffusion and the convection terms of the boundary layer equations, reducing to a hyperbolic partial differential equation and an ordinary differential equation in the incompressible case, and two partial differential equations and two ordinary differential equations in the compressible case. A FORTRAN program was written to solve the equations. Good agreement is found between this method and others in the prediction of skin friction and separation points where applicable. Author (ESRO)

N75-29045# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
ANALYSIS OF AN AXISYMMETRICAL TURBULENT PULSATING JET
D. Olivari Nov. 1974 46 p refs
(VKI-TN-104) Avail: NTIS HC $3.75

A synchronous frequency sampling technique was used for the experiments. Results are given for the development of mean velocity profiles and decay of centerline velocity, both as function of time inside a period and of the distance from the nozzle. Some results are given on the longitudinal turbulent fluctuation. The geometrical diameter of the nozzle was 3 mm and the frequency tested 88 and 176 Hz, at various jet velocities. A theoretical interpretation is given of the flow field which leads to the definition of the useful parameters characterizing the pulsating jet and allows a useful normalization of the results. Author (ESRO)

N75-29046# Royal Aircraft Establishment, Teddington (England). Aerodynamics Dept.

THE PREDICTION OF BOUNDARY-LAYER BEHAVIOUR AND PROFILE DRAG FOR INFINITE YAWED WINGS. PART 1: A METHOD OF CALCULATION

B. G. J. Thompson and A. G. J. Macdonald London Aeron. Res. Council 1974 66 p refs Supersedes RAE-TR-73092; ARC-35096

(ARC-CP-1307-Pt-1; RAE-TR-73092; ARC-35096) Avail: NTIS HC $4.25; HMSO £1.55; PHI $6.25

Cumpsty and Head's entrainment method for turbulent boundary layers was extended to compressible flow using Green's compressibility assumptions. The laminar layer was predicted using Thwaites' method in the chordwise plane and Nash's method spanwise. The Rott compressibility transformation was used, and the transition and wake assumptions are consistent with the two-dimensional profile drag method of Nash. The complete method, suitable for use in making routine design calculations, is described briefly. The relationships between calculation time, step length, and accuracy are considered for a practical infinite wing at transonic cruise conditions. The global iteration technique is shown to fail in regions of favorable pressure gradient, just downstream of the leading edge, as correction terms involving derivatives of integral cross-flow thicknesses are no longer small. A faster step-by-step numerical method was adopted to solve the differential equations of the integral turbulent boundary-layer method without convergence problems. Author (ESRO)

N75-29047# Royal Aircraft Establishment, Teddington (England). Aerodynamics Dept.

THE PREDICTION OF BOUNDARY-LAYER BEHAVIOUR AND PROFILE DRAG FOR INFINITE YAWED WINGS. PART 3: CALCULATIONS FOR A PARTICULAR WING

B. G. J. Thompson, G. A. Carr-Hill, and M. Ralph London Aeron. Res. Council 1975 56 p refs Supersedes RAE-TR-73090; ARC-35094

(ARC-CP-1309-Pt-3; RAE-TR-73090; ARC-35094) Avail: NTIS HC $4.25; HMSO £1.35; PHI $5.30

An integral method was used to predict boundary-layer and wake behavior for a family of infinite yawed wings having a chordwise section NPL 3111 operating at its design point. Profile drag predictions show a smaller variation with yaw than a typical project office design method, and the Reynolds number for incipient rear separation depends strongly on angle of yaw. Scale effect on loss of lift, due to viscous displacement of the potential flow, appears to be amplified by sweep.

Author (ESRO)

N75-29048# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.

THE DYNAMIC STABILITY DERIVATIVES OF A SLENDER WING AT ZERO AND MODERATE LIFE. A COMPARISON OF THEORY WITH FREE-FLIGHT MODEL TESTS, MACH NUMBER EQUALS 0.8 TO 2.0

A. Jean Ross, Geraldine F. Edwards, and A. P. Waterfall London ARC 1975 33 p refs Supersedes RAE-TR-73097; ARC-34897

(ARC-CP-1310; RAE-TR-73097; ARC-34897) Avail: NTIS HC $3.75; HMSO 85p; PHI $7.20

The longitudinal and lateral stability derivatives of a slender wing and fin configuration (AGARD G standard model) were measured using rocket-launched free-flight models. Comparisons are made with theoretical estimates of the derivatives and with previous experimental results from models flying at near-zero lift. The derivatives showing the greatest dependence on angle of attack are derived. Results also show that the linear theories used for obtaining values of these same derivatives at zero lift are inadequate at transonic speeds. Author (ESRO)

N75-29049# National Gas Turbine Establishment, Pyestock (England).

THRUST/DRAG ANALYSIS FOR A FRONT FAN NACELLE HAVING TWO SEPARATE CO-AXIAL EXHAUST STREAMS

P. G. Street London Aeron. Res. Council 1975 39 p refs Supersedes NGTE-321; ARC-34645

(ARC-CP-1311; ARC-34645; NGTE-321) Avail: NTIS HC $3.75; HMSO 90P; PHI $3.65

The forces acting on and around a high by-pass ratio front fan nacelle are considered in the light of findings on thrust and drag definitions for jet engines. From these considerations, thrust and drag components which take account of mutual interference are defined. A technique for defining an afterbody, or gas generator cowl drag in the presence of external flow, was derived, and the experimental measurements required are listed. Example calculations using experimental data were used to demonstrate the technique. Author (ESRO)

N75-29050# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.

A FINITE-DIFFERENCE SCHEME FOR COMPUTING SUPERCRITICAL FLOWS IN ARBITRARY CO-ORDINATE SYSTEMS

C. M. Albone London 1975 22 p refs

(ARC-CP-1313; RAE-TR-74090; ARC-35564) Avail: NTIS HC $3.25; HMSO 55 p; PHI $2.45

In the computation of flows with local Mach numbers in excess of unity, difficulty is experienced in obtaining numerical stability (where the coordinate system is not aligned with the local velocity vector). A new scheme is proposed for overcoming this difficulty. Its effectiveness was checked on a test case, and it was found to be stable. Author (ESRO)

N75-29051# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.

FREE-FLIGHT MODEL DYNAMIC STABILITY MEASUREMENTS ON A NOT-SO-SLENDER WING/FIN COMBINATION AT ZERO AND SMALL LIFT, MACH NUMBER EQUALS 0.8 TO 2.0

G. H. Greenwood and Geraldine F. Edwards London ARC 1975 61 p refs Supersedes RAE-TR-74054; ARC-35501

(ARC-CP-1315; RAE-TR-74054; ARC-35501) Avail: NTIS HC $4.25; HMSO £1.40; PHI $5.80

Dynamic longitudinal and lateral stability measurements were made in free flight at zero and small lift. Agreement between experiment and theory is generally good but exceptions were found in the magnitude and variation of the pitching moment derivative and the pitch-damping derivative. The effect of adding a small fairing in simulation of the support-sting shroud on complementary wind tunnel models appears to be confined to those stability derivatives. Author (ESRO)

N75-29052# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.

SECOND-ORDER SMALL-PERTURBATION THEORY FOR FINITE WINGS IN INCOMPRESSIBLE FLOW

J. Weber London Aeron. Res. Council 1975 53 p refs Supersedes RAE-TR-72171; ARC-34469

(ARC-R/M-3759; RAE-TR-72171; ARC-34469) Avail: NTIS HC $4.25; HMSO £2.80; PHI $10.85

The incompressible second-order theory for two-dimensional airfoils was extended to finite swept wings. The flow field is represented by distributions of sources and lifting singularities on the chord surface which contains the chord at each spanwise station. The strength of the source distribution was obtained as the sum of the distribution from first-order theory and a correction was derived from the second-order boundary condition. This involves the computation of the velocity which planar singularity distributions induce on and off the plane; the computation was done by computer programs. A generally applicable solution is derived, and using Taylor series expansions, this solution was simplified for the part of the wing away from center and tip. The problem of designing a wing of given thickness distribution (which has a prescribed pressure distribution on the upper surface) is also treated. Author (ESRO)

N75-29053# British Aircraft Corp. (Operating) Ltd., Bristol (England).

A LIFTING SURFACE THEORY METHOD FOR TREATING SWEPT OR SLENDER WINGS IN ATTACHED SUBSONIC FLOW

W. Kellaway London Aeron. Res. Council 1975 90 p refs Supersedes ARC-35352

(Contract MIN-DEF/PE-K5A/82)

(ARC-R/M-3760; ARC-35352) Avail: NTIS HC $4.75; HMSO £4.55; PHI $17.64

A method is described which is capable of calculating the

loading distribution on swept or slender planforms in attached, subsonic flow. Preliminary numerical results are presented which demonstrate that the method produces accurate, convergent loading solutions. Author (ESRO)

N75-29054# Royal Aircraft Establishment, Farnborough (England). Structures Dept.
A TECHNIQUE FOR ANALYSING THE RESULTS OF A FLUTTER CALCULATION
J. C. A. Baldock London Aeron. Res. Council 1975 36 p ref Supersedes RAE-TR-73168; ARC-35211
(ARC-R/M-3765; RAE-TR-73168; ARC-35211) Avail: NTIS HC $3.75; HMSO £1.90; PHI $7.65

A technique is presented for condensing a multi-degree-of-freedom flutter calculation so that similar flutter conditions are achieved with two degrees-of-freedom. Digital computer programs were used, and the process is largely automatic. Examples of the application of the technique are given which show that systems can often be reduced to two normal modes, or to two orthogonal combinations of normal modes, and that these modes can be interpreted physically. A detailed analysis of one of the derived two degree-of-freedom systems is made using a method restricted to a binary system; the condensation technique made possible the application of this method. Author (ESRO)

N75-29055# Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.
THE COMPUTATION OF AERODYNAMIC LOADS ON HELICOPTER BLADES IN FORWARD FLIGHT, USING THE METHOD OF THE ACCELERATION POTENTIAL
T. vanHolten Mar. 1975 131 p refs
(VTH-189) Avail: NTIS HC $5.75

A description of the flow field is presented which is based on the acceleration potential. The use of the acceleration potential allows a relatively easy derivation of lifting line theory using a matched asymptotic expansion technique. The systematic rather than intuitive treatment of lifting line theory afforded by this approach enables one to derive the form which lifting line theory should assume in order to be applicable to the case of the helicopter rotor. Two theories were developed: the first one involves errors of relative order of magnitude A to the minus 2nd power (where A is the aspect ratio of the blades); the second one is a more elaborate higher order method, involving relative errors of the order A to the minus 3rd power. If applied to the simpler case of the unswept wing in steady flow, these methods would reduce to Prandtl's classical method and to Weissinger's 3/4-chord method respectively. The matched asymtotic expansion analysis yields the complete pressure distribution over the blade's surface. Author (ESRO)

N75-29056# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
THE EFFECT OF A PYLON-MOUNTED NACELLE ON THE FLUTTER BEHAVIOUR OF A WING-PYLON-NACELLE CONFIGURATION
R. Roos and R. J. Zwaan 26 Sep. 1974 28 p refs
(NLR-TR-74125-U) Avail: NTIS HC $3.75

The aerodynamic interference effects on the aeroelastic behavior of a wing with a large pylon-mounted engine nacelle were investigated. Theoretical unsteady pressure distributions, obtained with the doublet lattice method, were compared with experimental data. The effect of the schematization of the pylon and nacelle was examined. The flutter behavior of the configuration was analyzed theoretically, and compared with experimental results. Author (ESRO)

N75-29057# Minnesota Univ., Minneapolis. Dept. of Aeronautics and Engineering Mechanics.
A PARACHUTE OPENING SHOCK THEORY BASED ON NONLINEAR TIME HISTORIES OF INFLOW VELOCITY AND PROJECTED AREA Final Report, Apr. 1973 - Jun. 1974
Helmut G. Heinrich, Robert A. Noreen, and David P. Sarri Jun. 1974 83 p refs
(Contract DAAG17-73-C-0174; DA Proj. 1F1-62203-AH-86) (AD-A005271; USA-NLABS-TR-75-10-AMEL) Avail: NTIS CSCL 01/3

The concept of a parachute opening shock calculation is shown which is based on the simultaneous solution of the equation of motion and the continuity equation with numerical inputs concerning the development of the projected area and the inflow velocity. Several area-time and velocity-time functions were extracted from wind tunnel and field test data and used for calculating a variety of test cases for which force-time recordings were available. GRA

N75-29058# Radio Corp. of America, Cape Kennedy, Fla.
SHIP TO SHORE OREGON TEST SERIES 2 Final Report
H. E. Reed 11 Jun. 1973 38 p
(Contract F08606-72-C-0029)
(AD-A006043; RCA/TELTA-TR-73-030; AFETR-75-11) Avail: NTIS CSCL 01/3

This report presents a detailed analysis of the cycle times, cable forces and aerodynamic measurements data obtained during the Oregon Test Series 2 tests conducted by the Range Measurements Laboratory at Culp Creek, Oregon, during the week of 12 - 16 March 1973. GRA

N75-29059# Radio Corp. of America, Cape Kennedy, Fla.
BALLOON ARMAMENT TEST (TEST PLAN)
Fred C. Minning 30 Apr. 1974 15 p
(Contract F08606-74-C-0025)
(AD-A006045; RCA/TELTA-TR-74-050; AFETR-75-16) Avail: NTIS CSCL 01/3

Under the sponsorship of the Armament Development and Test Center (ADTC) Eglin AFB, Florida, a series of tests were conducted by the Range Measurements Laboratory to aid in determining the feasibility of using a tethered balloon system as the lifting device for a munitions high angle impact facility. These tests were conducted during May 1974 at the Cape Canaveral Air Force Station utilizing the Family II 200,000 cubic foot balloon system which will be configured to provide an elevated stable point to support and release simulated ordnance from various impact angles. The tests were designed to closely approximate portions of the present high angle facility at Sandia and an operational balloon supported high angle facility. GRA

N75-29060# Radio Corp. of America, Cape Kennedy, Fla.
PROGRAM DESCRIPTION. THE ARPA/RML ATMOSPHERIC SCIENCES PROGRAM
Toxey A. Hall 31 Aug. 1973 20 p
(Contract F08606-73-C-0037)
(AD-A006044; RCA/TELTA-TR-73-031; AFETR-75-12) Avail: NTIS CSCL 01/3

A prime uncertainty in the use of Tethered Balloons for military, scientific or commercial roles is the assessment and minimization of hazards due to lightning. The Range Measurements Laboratory of the Air Force Eastern Test Range is conducting a test program to determine the protective measures which will provide the highest degree of personnel safety and system survivability. Scientific and technical guidance from academic and industrial researchers will augment existing capabilities for experiment design, materials testing and data analysis. GRA

N75-29010* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ON WAKE VORTEX ALLEVIATION
Leonard Roberts *In its* NASA/Univ. Conf. on Aeron. 1975 p 143-168 refs (For availability see N75-29001 20-01)
CSCL 01A

N75-29013* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPUTATIONAL AERODYNAMICS
Dean R. Chapman *In its* NASA/Univ. Conf. on Aeron. 1975 p 211-212 (For availability see N75-29001 20-01)
CSCL 01B

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N75-29061# Control Data Corp., St. Paul, Minn. Advanced Systems Div.

RESULTS OF AN AIRCRAFT VISIBILITY QUESTIONNAIRE CONCERNED WITH THE ESTIMATED BENEFITS OF AIRBORNE PROXIMITY WARNING INDICATOR SYSTEMS Final Technical Report, Oct. 1972 - Jan. 1975

W. Graham Jan. 1975 152 p refs

(Contract DOT-FA70WA-2263)

(AD-A009884; FAA-RD-75-46) Avail: NTIS HC $6.25 CSCL 01/3

The aircraft visibility questionnaire was distributed in an attempt to estimate the flying habits of various classes of pilots with respect to flight rule and meteorological conditions, to determine the opinions of these pilots about matters concerning the potential usefulness of Proximity Warning Indicators (PWI), and to poll pilot preferences with respect to the display of PWI information. Pilots holding ATR and instrument ratings were sampled along with commercial and private pilots without instrument ratings, students, and military pilots who held civil ratings. Estimates are given of the incidence of various meteorological conditions in 21 hubs in the U.S. and the percent of the time that pilots elect to fly instrument flight rules and visual flight rules under these conditions. Preferences of pilots for the relative bearing accuracy of PWI displays and for the type of display are reported. The mean time to abandon search failing detection after receipt of a traffic advisory is given as is the estimated time required to avoid an impending collision after detection of a threatening aircraft. Author

N75-29062# Systems Consultants, Inc., Falls Church, Va.

STUDY TO DEVELOP REGIONAL AND NATION-WIDE ESTIMATES OF GENERAL AVIATION (GA) ACTIVITY AT NON-TOWERED AIRPORTS Final Report

Pat Hager, Ron Hobbs, Girish Jindia, and Dale Wanderer Feb. 1975 103 p ref

(Contract DOT-FA72WA-2774)

(AD-A009883; SCI-2040-4; FAA-RD-75-43) Avail: NTIS HC $4.75 CSCL 01/3

A standardized statistical method for estimating traffic at nontowered airports through the use of a mathematical model was augmented to reflect general aviation (GA) activity only, and to develop an automated data base sufficient to estimate national and regional GA activity for all nontowered and tow airports in the continental United States. Topics discussed include selection of airports that represent 95% of the annual nationwide GA activity, selection of sample airports for the GA model development, the model development, input data base of GA activity model estimation, and model implementation computer program. Author

N75-29063# Federal Aviation Administration, Washington, D.C.

AN OVERVIEW OF THE FAA ENGINEERING AND DEVELOPMENT PROGRAMS WITH HIGHLIGHTS OF FISCAL YEARS, 1975-1976

Apr. 1975 29 p refs

(AD-A010266; FAA-EM-75-4) Avail: NTIS HC $3.75 CSCL 01/3

Progress is summarized in the areas of air traffic control, approach and landing systems, aeronautical satellites, radar navigation, aircraft safety in terms of reduction of accident fatality, and airport surface traffic control. Emphasis is placed on aircraft safety. J.M.S.

N75-29064# Mitre Corp., McLean, Va.

CIVIL AVIATION MIDAIR COLLISIONS ANALYSIS: 1972 ADDED TO 1964 - 1971 RESULTS Final Report

R. A. Rucker and T. R. Simpson Dec. 1974 85 p refs

(Contract DOT-FA70WA-2448)

(AD-A005897; FAA-EM-73-8-Add-1; MTR-6334-Suppl-1; D-43) Avail: NTIS HC $4.75 CSCL 01/2

An analysis of the potential effectiveness of alternative collision avoidance systems coverage in preventing a recurrence of similar aircraft collision fatalities of 1964-72 is presented. It concludes the 26% of the collisions (6% of fatalities)are systematically unpreventable, and shows that one particular system could have prevented 18% of the collisions (51% of fatalities), including all fatal collisions which involved air carriers. Author

N75-29065# Mitre Corp., McLean, Va.

VORTEX-RELATED ACCIDENTS OVER THE TEN YEAR PERIOD 1964 - 1973 Final Report

V. P. Gupta Apr. 1975 82 p refs

(Contract DOT-FA70WA-2448)

(AD-A010111; FAA-EM-75-6; MTR-6852) Avail: NTIS HC $4.75 CSCL 01/2

Out of the approximately 45,000 aviation accidents that occurred over the ten-year period 1964-73, in the conterminous United States, wake vortices were cited as a cause or as factor in 147 accidents by the National Transportation Safety Board (NTSB). These vortex-related accidents were studied and categorized (by flight phases of the vortex-generating aircraft and the accident aircraft, and other pertinent factors) with the objective of providing historical insight to the Wake Vortex Avoidance System (WVAS) development program, and to explore the possibility of procedural solutions to the vortex problem in various situations. The vortex problem was found to be largely confined to small general aviation aircraft landing or taking off close behind air carrier aircraft under VFR conditions. Landing behind another landing aircraft on the same runway was found to be the most frequent type of vortex-related accident. An intersection takeoff behind another takeoff from the threshold of the same runway was the second most frequent type. No intersection takeoff accident has, however, occurred since 1969 when a 3-minute separation rule was adopted for intersection takeoffs. Author

N75-29066*# Atlantic Research Corp., Alexandria, Va. EMM Dept.

REFINEMENT AND VALIDATION OF TWO DIGITAL MICROWAVE LANDING SYSTEM (MLS) THEORETICAL MODELS

William G. Duff and Charles R. Guarino 15 Aug. 1975 83 p refs

(Contract NAS1-13683)

(NASA-CR-132713) Avail: NTIS HC $4.75 CSCL 01E

Two digital microwave landing system theoretical models are considered which are generic models for the Doppler and scanning-beam frequency reference versions of the MLS. These models represent errors resulting from both system noise and discrete multipath. The data used for the validation effort were obtained from the Texas Instrument conventional scanning beam and the Hazeltine Doppler feasibility hardware versions of the MLS. Topics discussed include tape read software, time history plots, computation of power spectral density, smoothed power spectra, best-fit models, different equations for digital simulation, and discrete multipath errors. Author

N75-29067*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE ACCURACY OF FAR-FIELD NOISE OBTAINED BY THE MATHEMATICAL EXTRAPOLATION OF NEAR-FIELD NOISE DATA

Warren F. Ahtye and Steven Karel (Army Element, NASA) Jul. 1975 12 p refs

(NASA-TM-X-62434; A-6077) Avail: NTIS HC $3.25 CSCL 01C

Results are described of an analytical study of the accuracy and limitations of a technique that permits the mathematical extrapolation of near-field noise data to far-field conditions. The effects of the following variables on predictive accuracy of the far-field pressure were examined: (1) number of near-field microphones; (2) length of source distribution; (3) complexity of near-field and far-field distributions; (4) source-to-microphone distance; and (5) uncertainties in microphone data and imprecision in the location of the near-field microphones. It is shown that the most important parameters describing predictive accuracy are the number of microphones, the ratio of source length to

acoustic wavelength, (L/wavelength), and the error in location of near-field microphones. If microphone measurement and location errors are not included, then far-field pressures can be accurately predicted up to L/wavelength values of 15 using approximately 50 microphones. For maximum microphone location errors of + or - 1 cm, only an accuracy of + or - 2-1/2 db can be attained with approximately 40 microphones for the highest L/wavelength of 10. Author

N75-29068# Mitre Corp., McLean, Va.
INTERMITTENT POSITIVE CONTROL COMPUTER ALGORITHM FOR TEST BED EXPERIMENTS
A. L. McFarland and J. F. Golden 7 Apr. 1975 122 p refs Revised
(Contract DOT-FA70WA-2448)
(AD-A009215; MTR-6528-Rev-1; FAA-EM-74-2-Rev-1) Avail: NTIS HC $5.75 CSCL 01/2

Computer techniques are applied to modern aircraft guidance systems. Detailed flowcharts are provided and logical system interfaces are discussed. Author

N75-29069# Loughborough Univ. of Technology (England). Dept. of Transport Technology.
PASSENGER CONVEYOR ECONOMICS: COSTS, CAPACITY AND USER BENEFITS
P. M. Bunting Oct. 1974 111 p refs Sponsored by Sci. Res. Council
(TT-7409) Avail: NTIS HC $5.25

The costs of low and high-speed passenger conveyors are discussed. Three measures of capacity, 'theoretical', 'practical' and 'economic' are presented for a pallet system. Mathematical models were developed representing user benefits associated with conveyors serving a population along a linear street. Methods are generally applicable to conveyor systems, but specific calculations of capacity and user-benefits are related to a high-speed conveyor employing lenticular pallets. Author (ESRO)

N75-29070# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Zentralabteilung Luftfahrttechnik.
FLIGHT SAFETY WORK OF THE GERMAN AVIATION AND SPACE RESEARCH INSTITUTE
Ferdinand Schatt 14 Jan. 1975 44 p refs In GERMAN; ENGLISH summary Presented at the 26th Intern. Air Safety Seminar of the Flight Safety Found., Lisbon, 4-7 Nov. 1973
(DLR-Mitt-75-05) Avail: NTIS HC $3.75; DFVLR, Porz, West Ger. 19.20 DM

Tasks and organization of the establishment and its aeronautical research institutes are surveyed. Research topics in the field of flight safety are detailed for some institutes, and examples selected are based on usefulness for practical situations or aircraft operations. ESRO

N75-29071# Nielsen Engineering and Research, Inc., Mountain View, Calif.
EXTENSION OF THE METHOD FOR PREDICTING SIX-DEGREE-OF-FREEDOM STORE SEPARATION TRAJECTORIES AT SPEEDS UP TO THE CRITICAL SPEED TO INCLUDE A FUSELAGE WITH NONCIRCULAR CROSS SECTION. VOLUME 1: THEORETICAL METHODS AND COMPARISONS WITH EXPERIMENT Final Technical Report, Mar. 1972 - Feb. 1974
Marnix F. E. Dillenius, Frederick K. Goodwin, and Jack N. Nielsen Nov. 1974 98 p refs
(Contract F33615-72-C-1375; AF Proj. 8219)
(AD-A005822; NEAR-TR-60; AFFDL-TR-74-130-Vol-1) Avail: NTIS CSCL 01/3

The primary objective of this report is to describe improvements and extensions which have been made to the method of predicting six-degree-of-freedom trajectories of stores released from fighter-bomber aircraft previously published by the authors in AFFDL-TR-72-83. In the present work, the circular fuselage restriction has been removed. Methods are presented for flow modeling fuselages with non-circular cross sections including canopies and engine air inlets. GRA

N75-29072# IIT Research Inst., Chicago, Ill.
SPECTRAL ANALYSIS OF DOPPLER MLS VIDEO DATA Final Report, 26 Aug. - 16 Dec. 1974
L. C. Calhoun, S. Kazel, and A. E. Brindley Jan. 1975 28 p refs
(Contract F33615-72-C-1024; AF Proj. 404L)
(AD-A006436; AFFDL-TR-75-6) Avail: NTIS CSCL 17/7

The report describes an experimental effort to examine the spectral content of flight test data recorded during Phase II of the National Landing Plan. The data examined here were obtained from the ITT and Hazeltine Doppler systems flown at NAFEC and Wallops Station respectively. A primary objective of the effort was to determine from the spectra whether in fact either of the systems experienced significant multipath interference during flight tests. The hardware used for this analysis was an improved version of that generated by IITRI for the USAF's Concept Validation Program. GRA

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N75-29073# Mitre Corp., McLean, Va.
STATISTICAL SUMMARY OF THE 1983 LOS ANGELES ENROUTE CENTER STANDARD TRAFFIC MODEL Final Report
Saul Cohen Oct. 1974 99940 p refs
(Contract DOT-FA70WA-2448)
(AD-A009011; MTR-6676; FAA-RD-74-43) Avail: NTIS HC $3.75 CSCL 17/7

The 1983 Los Angeles center standard traffic model, a scan-to-scan computer generated air traffic simulation, is statistically summarized for typical snapshots. The distributions of traffic by speed, altitude, density and various aircraft categories are presented. In addition, 1973 distributions are displayed for comparison to 1983. Author

N75-29074# National Aviation Facilities Experimental Center, Atlantic City, N.J.
EVALUATION OF A VERY LOW FREQUENCY NAVIGATION SYSTEM Final Report, Jul. 1972 - Mar. 1974
Richard Gober Jan. 1975 111 p
(AD-A005043; FAA-NA-74-35; FAA-RD-74-198) Avail: NTIS HC $5.25 CSCL 17/7

The results of flights using existing phase stable very low frequency (VLF) communication stations for air navigation are presented. The Global Navigation System's (GNS-200) VLF system was used to provide course deviation, distance-to-go, and groundspeed. It is concluded that the VLF is an acceptable air navigation aid and exceeds the positioning and guidance features of Loran A. The weakest point is the availability of VLF ground stations, and an adequate VLF monitoring system is not available. Author

N75-29075# Lincoln Lab., Mass. Inst. of Tech., Lexington.
IMPROVED MTI RADAR SIGNAL PROCESSOR
W. H. Drury 3 Apr. 1975 90 p
(Contracts DOT-FA72WAI-242; F19628-73-C-0002)
(AD-A010478; ATC-39; FAA-RD-74-185) Avail: NTIS HC $4.75 CSCL 17/7

A radar digital signal processor for use with airport surveillance radar (ASR) radars is described. It features spectral processing accomplished by combining a 3-pulse canceller with an 8-point, weighted, discrete Fourier transform and adaptive thresholds. This combination of circuits provides a 20-db increase in moving target indicator (MTI) improvement factor over present ASR's and is within 2 db of optimum processing results. An auxiliary channel is provided to allow detection of any target traveling tangentially if its return exceeds the level of ground clutter return in the occupied range/azimuth cell. The spectral processing technique provides discrimination against weather clutter if the

returns from weather and from the target fall into different Doppler frequency regions. The output from this equipment is digital and is reported for transmittal to the ARTS-III IOP computer.
Author

N75-29076# National Aviation Facilities Experimental Center, Atlantic City, N.J.
PRELIMINARY TWO-DIMENSIONAL AREA NAVIGATION TERMINAL SIMULATION Final Report, Jan. - Mar. 1974
John Maurer, Paul J. OBrien, and William Crimbring Feb. 1975 99 p refs
(AD-A006263; FAA-RD-74-209) Avail: NTIS HC $5.25 CSCL 17/7

A dynamic simulation, was conducted to determine the effect on the air traffic control (ATC) system and the system users resulting from the use of area navigation (RNAV) in a high-density terminal area. The simulation study analyzed selected controller workload and system performance measures for two route configurations representing two time frames and various percentage mixes of RNAV and non-RNAV operations. Results indicated that controllers could use RNAV maneuvers in the control of traffic in lieu of radar vector techniques and that controller workload decreased as the RNAV participation level increased. Controller acceptance of RNAV principles and techniques in terminal ATC increased as familiarity and experience with the various RNAV functions were gained. Subjective results pointed out that in order that RNAV be an effective tool within the terminal air traffic system, adequate training and a thorough familiarization with RNAV procedures, capabilities, and limitations would be a requirement for both controllers and pilots. GRA

N75-29077# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
RELIABLE LINE SIGNALING TECHNIQUES FOR THE FAA GRN-27(V) AND CAT-3 ILS Interim Report, 1 Jul. - 31 Dec. 1974
S. C. Bass, S. Belter, S. C. Chen, T. Findakly, C. Greenblatt, H. Hwang, B. J. Leon, W. Peele, P. Petrowski, and C. Williams Mar. 1975 80 p refs
(Contract DOT-FA74WA-3518)
(AD-A009881; FAA-RD-75-11) Avail: NTIS HC $4.75 CSCL 17/7

The effect of power line transients and lightning interference on solid state equipment is investigated. Specifically, this effort is directed toward protection of the GRN 27 (V) and the FAA MARK 3 type Instrument Landing Systems. Recommended system changes consisting of changes in the method of signaling from unblanced, nonisolated to a blanced, isolated configuration with tone signaling are given. Author

N75-29078# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DABS LINK PERFORMANCE CONSIDERATIONS
G. J. Schlieckert 28 Apr. 1975 59 p refs
(Contracts DOT-FA72WAI-261; F19628-73-C-0002)
(AD-A009429; ATC-41; FAA-RD-74-186) Avail: NTIS HC $4.25 CSCL 17/7

The discrete address beacon system (DABS) link performance was computed using the present values for the system operating parameters and the available models that describe environmental and aircraft antenna effects. The various fade mechanisms are described, and a statistical determination of performance is proposed. The performance is computed for various sets of conditions including different ground antennas, aircraft maneuvers, antenna pedestal heights, ground reflection coefficients, and reduced power. Also discussed are the effects of obstructions and the performance when aircraft are in the cone of silence. The DABS link is found to have good overall performance with only small regions of reduced reliability that are at low angles or due to maneuvers. Those missed replies due to maneuvers are found to be sporadic from scan to scan. Author

N75-29079# Lincoln Lab., Mass. Inst. of Tech., Lexington.
FURTHER STUDIES OF ATCRBS BASED ON ARTS-3 DERIVED DATA
A. G. Cameron 13 Dec. 1974 148 p refs
(Contracts DOT-FA72WAI-242; F19628-73-C-002)
(AD-A005568; ATC-38; FAA-RD-74-145) Avail: NTIS HC $5.75 CSCL 17/7

Digital data extracted from operational radar beacon processing systems is presented. The major topics considered were false targets caused by multipath reflections, and asynchronous interference (fruit). Four different mechanisms resulting in false targets were observed in the data and are discussed in detail. In addition, levels of asynchronous interference as measured and analyzed, and two procedures are discussed by which the characteristics of the interrogators responsible for the fruit (including location) can be determined. One of these is described in detail, and shown to yield results that agree closely with known parameters. Several other topics, including improper reply decoding, are also described. Author

N75-29080# National Aviation Facilities Experimental Center, Atlantic City, N.J.
TESTS WITH COAXIAL TACAN ANTENNA AT DOPPLER VERY HIGH FREQUENCY OMNIRANGE (VOR) Final Report, Apr. - Oct. 1974
Wayne E. Bell May 1975 48 p refs
(AD-A010008; FAA-NA-74-58; FAA-RD-75-27) Avail: NTIS HC $3.75 CSCL 17/7

The performance is described of Doppler very high frequency omnirange (DVOR) systems with and without a coaxially located tactical air navigation (TACAN) antenna. Flight tests were conducted to determine double-sideband DVOR (DSDVOR) and single-sideband DVOR (SSDVOR) system performance for each condition. Test results show that the error of a SSDVOR station increases to + or - 1.8 when a TACAN antenna is coaxially located. The DSDVOR system error increase an average of + or - 0.25 with the installation of a TACAN antenna coaxially. It is recommended that the TACAN antenna be considered for coaxial location when DSDVOR is used. Author

N75-29081# Mitre Corp., Atlantic City, N.J.
DISCRETE ADDRESS BEACON SYSTEM/AIR TRAFFIC CONTROL INTERFACE CONFIGURATION DOCUMENT. VOLUME 2: ENROUTE HARDWARE FOR PHASE 1 Final Report
R. A. Westcott Sep. 1974 35 p 3 Vol.
(Contract DOT-FA69NS-162)
(AD-A009307; MTR-4243-VOL-2; FAA-RD-74-165-2) Avail: NTIS HC $3.75 CSCL 17/7

The En Route hardware interfaces to be used for Phase/DABS/IPC testing and CMA testing involving NAFEC facilities and the discrete address beacon system experimental facility (DABSEF) are described. It is intended that this document provide the base line for En Route interface hardware configuration control. For Vol. 1 see, N75-18199. Author

N75-29082# Operations Research, Inc., Silver Spring, Md.
ENGINEERING STUDIES IN SUPPORT OF THE IMPLEMENTATION PLAN FOR THE DISTRESS ALERTING AND LOCATING SYSTEM DALS, VOLUME 1 Final Report, 29 Mar. - 30 Oct. 1974
J. Brown, M. Kim, and E. Patton 30 Oct. 1974 172 p refs
(Contract DOT-CG-31446-A)
(AD-A005273; ORI-TR-870-Vol-01; NSCG-D-48-75-Vol-01) Avail: NTIS CSCL 06/7

The report documents the analysis of several engineering questions associated with the implementation of a Distress Alerting and Locating System (DALS). These engineering questions fall under two major categories. If the existing USCG VHF/FM National Distress System receiving sites were used for DALS, what coverage zones would be achieved. With these coverage zones, can three frequency Omega ambiguity resolution be achieved. If not, what techniques are available to resolve the ambiguity. What interference effects will be experienced if a DALS transmission and a VHF/FM voice transmission are coincident in time in the same VHF/FM channel assignment (i.e., Channel 16). What technical problems will be encountered in attempting to use the communications facilities associated with the existing National Distress System. Under the second category, the following specific question was addressed. What are the costs and benefits associated with DALS systems with varying capabilities. Results were obtained in all the above questions and are contained in the report. GRA

N75-29083# Princeton Univ., N.J. School of Engineering and Applied Science.
SIMULATION MODEL FOR NEW YORK AIR TRAFFIC CONTROL COMMUNICATIONS Interim Report, Jul. 1973 - Jun. 1974
J. S. Hunter Feb. 1975 241 p
(Contract DOT-FA72NA-741)
(AD-A006426; FAA-RD-74-203) Avail: NTIS CSCL 17/7

This volume describes the construction, validation, and application of a simulation model for air traffic control (ATC) communications. The model is based upon an extensive statistical analysis of voice communications data gathered over the New York area during a busy 2-hour period. The structure of the simulation model is discussed along with the associated GPSS V program. The input parameters are outlined, and various master tables and equations are employed to capsulate the information provided by the earlier statistical analyses. Methods for validating the simulation model are described for particular sectors and sector functions. A new statistical testing procedure for comparing both simulated and historical time series traces is evoked. The responses of major interest are the aircraft loading, channel utilization, and communications queueing, the last of which can only be secured through simulation. GRA

N75-29084# Facility Checking Squadron (1866th) (AFCS), Richards-Gebaur AFB, Mo.
TACAN AND ILS STATION EVALUATION REPORT, LORING AFB, MAINE
Joseph N. Raeth 13 Dec. 1974 111 p
(AD-A006416; Rept-74/66N-21) Avail: NTIS CSCL 17/7

The evaluation report presents data collected and analyzed to define the capabilities and limitations of the Loring AFB TACAN (AN/GRN-20B), ILS (AN/MRN-7 and AN/MRN-8), and associated power systems. This report documents the inconsistent width and angle measurement indicated on the glide slope. Analysis of evaluation results and recommendations are presented. Airborne and ground evaluations indicated that the facilities were fully capable of providing satisfactory service. GRA

N75-29085# Aerospace Guidance and Metrology Center, Newark Air Force Station, Ohio.
SOME INDICATORS FOR INERTIAL NAVIGATION SYSTEMS RELIABILITY Final Report
Richard W. Rogge 1 Aug. 1974 18 p refs
(AD-A006439; AGMC-74-044; AGMC-SNR-115-74-1) Avail: NTIS CSCL 17/7

The paper attempts to clarify some of the measurements of inertial navigation reliability (INS) as applied to evaluation of depot or TRC repair. It points out the effect of flying hours programs on MTBF and shows that time between overhaul (TBO) is the best measurement of INS reliability for the TRC. GRA

N75-29086# Transportation Systems Center, Cambridge, Mass.
ADVANCED AIR TRAFFIC MANAGEMENT SYSTEM STUDY: TECHNICAL SUMMARY Final Report, 1 Jul. 1973 - 30 Jun. 1974
30 Jun. 1974 213 p refs
(PB-241223/7; DOT-TSC-OST-75-6) Avail: NTIS HC $7.25 CSCL 17G

Study and development plans are summarized for the air traffic management system of the late 1980's and beyond. The plans are presented in the framework of an evolutionary system concept of traffic management, building upon the upgraded third generation air traffic control system, and defined to meet the projected demands for service, safety, and flexibility in a cost effective manner. In order to provide the information needed for planning future system developments, a program of research and development is described for the system concept presented. GRA

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N75-29087*# Joint Publications Research Service, Arlington, Va.
ON AN AIRPLANE IN OUTER SPACE
V. Shatalov Washington NASA Jul. 1975 17 p Transl. into ENGLISH from Nauka i Zhizn (USSR), no. 11, Nov. 1974 p 25-32 Sponsored by NASA
(NASA-TT-F-16423) Avail: NTIS HC $3.25 CSCL 01C

The possibility of a space aircraft are discussed in terms of the transfer of technology between aviation and space engineering. The creation of aerobuses, mastery of supersonic speeds, overcoming the heat barrier, the rarefield atmosphere, and the development of hypersonic aircraft as transport vehicles between earth and space stations are among the factors considered. J.M.S.

N75-29088*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
A LEADING EDGE HEATING ARRAY AND A FLAT SURFACE HEATING ARRAY - OPERATION, MAINTENANCE AND REPAIR MANUAL
1 Jul. 1975 122 p
(Contract NAS9-14041)
(NASA-CR-144357; MDC-E1234; JSC-09492) Avail: NTIS HC $5.25 CSCL 01C

A general description of the leading edge/flat surface heating array is presented along with its components, assembly instructions, installation instructions, operation procedures, maintenance instructions, repair procedures, schematics, spare parts lists, engineering drawings of the array, and functional acceptance test log sheets. The proper replacement of components, correct torque values, step-by-step maintenance instructions, and pretest checkouts are described. M.J.S.

N75-29089*# North American Rockwell Corp., Los Angeles, Calif.
THEORETICAL PREDICTION OF AIRPLANE STABILITY DERIVATIVES AT SUBCRITICAL SPEEDS
J. Tulinius, W. Clever, A. Nieman, K. Dunn, and B. Gaither [1973] 598 p refs
(Contract NAS1-10828)
(NASA-CR-132681; NA-72-803) Avail: NTIS HC $13.25 CSCL 01C

The theoretical development and application is described of an analysis for predicting the major static and rotary stability derivatives for a complete airplane. The analysis utilizes potential flow theory to compute the surface flow fields and pressures on any configuration that can be synthesized from arbitrary lifting bodies and nonplanar thick lifting panels. The pressures are integrated to obtain section and total configuration loads and moments due side slip, angle of attack, pitching motion, rolling motion, yawing motion, and control surface deflection. Subcritical compressibility is accounted for by means of the Gothert similarity rule. Author

N75-29090# MAN-Acoustics and Noise, Inc., Seattle, Wash.
ESTABLISHING CERTIFICATION/DESIGN CRITERIA FOR ADVANCED SUPERSONIC AIRCRAFT UTILIZING ACCEPTANCE, INTERFERENCE, AND ANNOYANCE RESPONSE TO SIMULATED SONIC BOOMS BY PERSONS IN THEIR HOMES Final Report
J. E. Mabry and P. B. Oncley Mar. 1975 99 p refs
(Contract DOT-FA74WAI-444)
(AD-A009656; MAN-1010; FAA-RD-75-44) Avail: NTIS HC $5.25 CSCL 01/3

Community Noise Simulation Systems were designed and fabricated, and simulated sonic booms were introduced into the homes of twelve subject families. Acceptance, interference, and annoyance response data were obtained. Three boom levels and two frequency schedules (average of two or one per hour from 0700 to 2200 hours) are studied. It was concluded that for

establishing a design/certification sonic boom threshold of acceptability for advanced supersonic transports, a level of 87 db (using S.S. Stevens' Mark VI) should be considered for indoor living with not more than fifteen daily boom exposures (no nighttime booms). It was also concluded that the realistic simulation approach developed utilizing Community Noise Simulation Systems is technically feasible and has high utility. It can be used to establish standards involving traffic noise, noise from airports, construction noise, and effects of industrial noise on surrounding communities. Author

N75-29091*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
THE EFFECT OF WING DIHEDRAL AND SECTION SUCTION DISTRIBUTION ON VORTEX BURSTING
Karen E. Washburn and Blair B. Gloss Aug. 1975 72 p refs
(NASA-TM-X-72745) Avail: NTIS HC $4.25 CSCL 01A

Eleven semi-span wing models were tested in the 1/8-scale model of the Langley V/STOL tunnel to qualitatively study vortex bursting. Flow visualization was achieved by using helium filled soap bubbles introduced upstream of the model. The angle of attack range was from 0 deg to 45 deg. The results show that the vortex is unstable, that is, the bursting point location is not fixed at a given angle of attack but moves within certain bounds. Upstream of the trailing edge, the bursting point location has a range of two inches; downstream, the range is about six inches. Anhedral and dihedral appear to have an insignificant effect on the vortex and its bursting point location. Altering the section suction distribution by improving the triangularity generally increases the angle of attack at which vortex bursting occurs at the trailing edge. Author

N75-29092*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
CRACK GROWTH IN Ti-8Al-1Mo-1V WITH REAL-TIME AND ACCELERATED FLIGHT BY FLIGHT LOADING
L. A. Imig 30 Jul. 1975 35 p refs
(NASA-TM-X-72754) Avail: NTIS HC $3.75 CSCL 01C

Crack growth in Ti-8Al-1Mo-1V was measured and calculated for real time and accelerated simulations of supersonic airplane loading and heating. Crack-growth rates calculated on the assumption that an entire flight could be represented by a single cycle predicted the experimental rates poorly. Calculated crack growth rates were slower than the experimental rates for all tests with flight-by-flight loading. For room temperature accelerated tests, the calculated rates agreed well with the experimental rates; but the calculations became progressively less accurate for progressively more complex test conditions (tests that included elevated temperature). Author

N75-29093*# Douglas Aircraft Co., Inc., Long Beach, Calif.
CONCEPTUAL DESIGN STUDY OF ADVANCED ACOUSTIC-COMPOSITE NACELLES
Kenneth E. Nordstrom, Alan H. Marsh, and Donald F. Sargisson (GE) Jul. 1975 200 p refs
(Contract NAS1-13356)
(NASA-CR-132703; MDC-J6891) Avail: NTIS HC $7.00 CSCL 01C

Conceptual studies were conducted to assess the impact of incorporating advanced technologies in the nacelles of a current wide-bodied transport and an advanced technology transport. The improvement possible in the areas of fuel consumption, flyover noise levels, airplane weight, manufacturing costs, and airplane operating cost were evaluated for short and long-duct nacelles. Use of composite structures for acoustic duct linings in the fan inlet and exhaust ducts was considered as well as for other nacelle components. For the wide-bodied transport, the use of a long-duct nacelle with an internal mixer nozzle in the primary exhaust showed significant improvement in installed specific fuel consumption and airplane direct operating costs compared to the current short-duct nacelle. The long-duct mixed-flow nacelle is expected to achieve significant reductions in jet noise during takeoff and in turbo-machinery noise during landing approach. Recommendations were made of the technology development needed to achieve the potential fuel conservation and noise reduction benefits. Author

N75-29094# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
LONGITUDINAL MOTIONS OF AIRCRAFT INVOLVING HIGH ANGLES OF ATTACK
H. H. B. M. Thomas and Joan Collingbourne London Aeron. Res. Council 1974 100 p refs Supersedes RAE-TR-73011; ARC-34703
(ARC-R/M-3753; RAE-TR-73011; ARC-34703) Avail: NTIS HC $4.75; HMSO £4.85; PHI $18.85

A general introduction is presented to the longitudinal motion of aircraft over an extended range of angle of attack, and various aspects were investigated of the low-speed-deceleration maneuvre with excursion of very high angles of attack in the case of failure to recover. The entry into such flight conditions of two distinct types of aircraft-one with a wing of moderately large aspect-ratio and having a high tailplane, the other, a tailless slender aircraft-is considered in some detail by examining the effect of various inputs on the motion. The factors influencing the ease with which control of the aircraft may be regained were studied particularly in cases in which normal recovery was achieved by forceful recovery action and those in which the aircraft only recovers after an excursion to extreme angles of attack. The possibility of recovery is found to depend on the general nature of the motion under the action of markedly nonlinear aerodynamic forces and moments. For aircraft having pitching-moment characteristics like those of the subject aircraft, three types of motion can follow an attempt at recovery. There can be a reduction to two or even one as out-lined in the appendix. The problem of the stability of these motions was investigated. Examination of the allied single degree-of-freedom motion in pitch provides much insight into the more general problem, while phase-plane and similar three-dimensional plots prove useful means of displaying and interpreting results. The effect of varying the aircraft characteristics was examined. Various forms and levels of damping are considered as well as the more evident effects of the center-of-gravity position and the inertia-in-pitch of the aircraft. Author (ESRO)

N75-29095# National Centre of Tribology, Risley (England). European Space Tribology Lab.
THERMAL VACUUM ACCEPTANCE TEST OF NO. 2 HAWKER SIDDELEY DYNAMICS LOW SPEED MECHANISM
J. Gillies and N. G. Wilson Feb. 1975 50 p Sponsored by ESRO
(ESRO-ESTL-10; ESRO-CR(P)-654) Avail: NTIS HC $3.75

The second of the solar paddle drive mechanisms manufactured under the ESTEC supporting technology program was submitted to thermal vacuum acceptance tests. This involved four separate tests, each of 4 hours duration, with the mechanism operated at normal speed, 24 times normal speed, and acquisition speed, while being subjected to temperatures marginally more extreme than those anticipated in satellite operation. Measurements were made of the angular error (the difference between clock demand and actual shaft position), drive motor power, temperatures throughout the mechanism, and power slip ring noise levels. The mechanism was shown to operate within its specification during all its tests. Results of all the measurements are summarized. Author (ESRO)

N75-29096# Centre National d'Etudes Spatiales, Toulouse (France).
THERMAL CONTROL OF TETHERED BALLOON GONDOLAS [CONTROLE THERMIQUE DES NACELLES DE BALLONS CAPTIFS]
Irenee Alet Mar. 1975 30 p In FRENCH; ENGLISH summary
(CNES-NT-10) Avail: NTIS HC $3.75

Problems related to the thermal control of high altitude tethered balloon's gondola are discussed. Various solutions are considered together with their principles. Several types of gondola structures are compared from a thermal point of view. The collection, transport, and storage of solar energy in heating form are described; the energy is used to maintain the on-board equipment in a temperature limit suitable for good operation. Author (ESRO)

N75-29097# System Innovation and Development Corp., Rolling Hills Estates, Calif.
AUTOMATIC EXTERNAL LOAD AQUISITION BY HELICOPTER Final Report
David T. Liu Nov. 1974 189 p
(Contract DAAJ02-72-C-0067; DA Proj. 1F1-62203-AA-33)
(AD-A005051; USAAMRDL-TR-74-86) Avail: NTIS CSCL 01/3

The objectives of this study program were to establish the system requirements, to develop conceptual designs, and to analyze the feasibility of various system designs for cargo helicopters to acquire external loads without the need for manual attachment of the load to the helicopters in a loading operation. Current technology for handling external helicopter loads were reviewed. Applicable cargo handling technology in commercial and maritime operation was also surveyed. The characteristics of helicopter external loads and lifting provisions were analysed. Army air transportability requirements were established for helicopters to identify technical and operational system design requirements for automatic load acquisition. Various conceptual system designs were formulated and system feasibility analyses were conducted. GRA

N75-29098# Army Aviation Systems Command, St. Louis, Mo.
MAJOR ITEM SPECIAL STUDY (MISS), UH-1H 90 DEGREES T/R GEAR BOX Interim Report, Jan. 1964 - Jun. 1974
Mar. 1975 21 p
(AD-A006506; USAAVSCOM-TR-74-58) Avail: NTIS CSCL 01/3

Major Item Special Study (MISS) reports are performed on DA Form 2410 reportable components. These are time change items and certain condition change items selected because of high cost or need for intensive management. Basically, the MISS reports are concerned with analyzing reported removal data presented in the Major Item Removal Frequency (MIRF) report. The failure modes reported for each removal are examined and grouped into categories which are intended to clarify the intent of the data reporting. From this data, removal distribution can be plotted and an MTR (mean time to removal) can be calculated. The MISS reports then investigate possible cost savings based on total elimination of selected failure modes. These modes are chosen because of the percentage of failures they represent and/or because they appear to be feasible Product Improvement Program (PIP) areas. GRA

N75-29099# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
FULL-SCALE AERODYNAMIC AND ENGINE TESTING OF THE APL SYMDEL Mk 6 RPV
R. H. Cramer and M. L. Hill Oct. 1974 133 p refs
(Contract N00017-72-C-4401)
(AD-A006283; APL-TR-1257) Avail: NTIS CSCL 01/3

This report presents documentation of the wind tunnel testing of the APL Symdel Mk VI remotely piloted vehicle (RPV). The purpose of these tests was to determine the aerodynamic features, live engine performance, and active control servo responses of the RPV. Standard six component aerodynamic data are given for six alternative configurations. GRA

N75-29100# Army Aviation Systems Command, St. Louis, Mo.
OPTIMIZATION OF THE TIME BETWEEN AIRCRAFT OVERHAULS BY MINIMIZING MAINTENANCE COST Final Report
Shirley J. Smith, Florence A. Gaffney, Billy R. Schulze, D. Frank Fox, and Blaine T. Stone Jan. 1975 70 p refs
(AD-A006505; USAAVSCOM-TR-74-53) Avail: NTIS CSCL 01/3

The purpose of the study was to investigate the feasibility of determining when an aircraft should be overhauled in order to minimize the life time maintenance cost of the aircraft. It was assumed that the cost of field maintenance increases as the aircraft's flight hours increase. Also, it was assumed that following an overhaul the cost rate drops significantly, then increases again until an overhaul. The total life time maintenance cost is the sum of all field maintenance costs and all overhaul costs. Then, the optimum time between overhauls was found as that time for which the life time maintenance cost is a minimum. GRA

N75-29101# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
F-89 HYDRAULIC ACTUATOR COMBINATORIAL GEOMETRIC REPRESENTATION Final Report, Sep. - Dec. 1973
John Dunn and Gerald Bennett Jan. 1975 36 p
(AD-A006435; ASD/XR-74-9; JTCG/AS-74-V-009) Avail: NTIS CSCL 01/3

This report summarizes development of a computerized geometric representation of an F-89 aileron actuator for the MAGIC computer program. The MAGIC program uses the techniques of combinatorial geometry to describe components and was developed for vulnerability analysis uses. Procedures used to idealize the actuator, and develop and debug the MAGIC descriptions, are described and problems encountered are discussed. Results of the MAGIC description and typical cross section plots are presented. GRA

N75-29102# Aeronautical Research Associates of Princeton, Inc., N.J.
A DIRECT TIME HISTORY STUDY OF THE RESPONSE OF AN AIRPLANE TO NONSTATIONARY TURBULENCE Final Report, 15 Nov. 1973 - 15 Jan. 1975
John C. Houbolt and Guy Williamson Jan. 1975 71 p refs
(Contract F33615-74-C-3006; AF Proj. 1367)
(AD-A006159; ARAP-230; AFFDL-TR-74-148) Avail: NTIS CSCL 01/1

Previous nonstationary turbulence studies are discussed. A novel way for evaluating the impulse response function for gust encounter is derived, which automatically takes into account nonsteady lift and gust penetration effects. Various nonstationary gust fields, having spectral content and level exceedance behavior representative of atmospheric turbulence, are then synthesized; airplane response is evaluated in explicit time history form so that all transient effects are included. The generalized load exceedance curves derived from the time histories are compared with the results that are indicated by an existing technique which derives nonstationary results on the basis of local stationary encounters. GRA

N75-29014* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
SOME TRENDS IN AIRCRAFT DESIGN: STRUCTURES
George W. Brooks *In its* NASA/Univ. Conf. on Aeron. 1975 p 213-272 refs (For availability see N75-29001 20-01)
CSCL 01C

N75-29016* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
OPPORTUNITIES FOR AERODYNAMIC-DRAG REDUCTION
Robert E. Bower *In its* NASA/Univ. Conf. on Aeron. 1975 p 323-352 refs (For availability see N75-29001 20-01)
CSCL 01C

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N75-29011* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AIRBORNE ELECTRONICS FOR AUTOMATED FLIGHT SYSTEMS
George B. Graves, Jr. *In its* NASA/Univ. Conf. on Aeron. 1975 p 169-182 refs (For availability see N75-29001 20-01)
CSCL 01D

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N75-29103+ Engineering Sciences Data Unit, London (England).
ESTIMATION OF SUBSONIC FAR-FIELD JET-MIXING NOISE
Jun. 1973 14 p
(ESDU-74002) Copyright. Avail: NTIS HC $74.50

A method is described for estimating far-field jet mixing noise emanating from gas turbine exhaust for fly-over, and side-line noise level of jet aircraft. The method is applicable to the far-field (distances greater than 50 jet diameters from the exit), for subsonic jets with temperature ratios between 1 and 3.2, and pressure ratios between 1.1 and 1.9. Author

N75-29104+ Engineering Sciences Data Unit, London (England).
AN INTRODUCTION TO GAS TURBINE EXHAUST NOISE
Jun. 1973 10 p refs Sponsored in part by Ministry of Defense (Procurement Executive) and the Roy. Aeron. Soc.
(ESDU-74001) Copyright. Avail: NTIS HC $50.50

Various noise sources associated with gas turbine exhausts are described. The data are applicable to methods for estimating the magnitude of exhaust noise sources for far-field noise, which is assumed to be at distances greater than 50 jet diameters. Author

N75-29105# National Aerospace Lab., Tokyo (Japan).
INVESTIGATION OF THE FLOWS FLOWING FROM SWIRLERS, 1
Tetsuro Aiba 1974 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-376) Avail: NTIS HC $3.25

The air flows from axial swirlers were studied. These flows give predominant effects to the flames held by the swirlers through characteristics such as recirculation zones and mixing processes between air and fuel. Pressure probes and a hot wire probe were used for measuring pressure and velocity profiles, recirculation zones, flow patterns, swirl numbers, and intensity of turbulence. Four axial swirlers with different axial lengths were employed in the experiments to show the effects of the vane's overlap. The results showed asymptotic profiles of the measured values by increasing the vane's overlap. Numerical calculation of the flows was carried out to compare with the experimental results. Author

N75-29106*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SUMMARY OF MODEL VTOL LIFT FAN TESTS CONDUCTED AT NASA LEWIS RESEARCH CENTER
James H. Diedrich 1975 23 p refs Presented at Workshop on Prediction Methods for Jet V/STOL Propulsion Aerodynamics, Arlington, Va., 28-31 Jul. 1975; sponsored by Naval Air Systems Command
(NASA-TM-X-71778; E-8436) Avail: NTIS HC $3.25 CSCL 21E

The purpose of the tests was to obtain overall performance and influencing factors as well as detailed measurements of the internal flow characteristics. The first experiment consisted of crossflow tests of a 15-inch diameter fan installed in a two-dimensional wing. Tests were run with and without exit louvers over a range of tunnel speeds, fan speeds, and wing angle of attack. The wing was used for a study of installation effects on lift fan performance. The model tested consisted of three 5.5-inch diameter tip-turbine driven model VTOL lift fans mounted chord-wise in the two-dimensional wing to simulate a pod-type array. Several inlet and exit cover door configurations and an adjacent fuselage panel were tested. For the third program, a pod was attached to the wing, and an investigation was conducted of the effect of design tip speed on the aerodynamic performance and noise of a 15-inch diameter lift fan-in-pod under static and crossflow conditions. Three single VTOL lift fan stages were designed for the same overall total pressure ratio but at three different rotor tip speeds. Author

N75-29107*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL VERIFICATION OF FILM-COOLING CONCEPTS ON A TURBINE VANE
Herbert J. Gladden and James W. Gauntner 1975 14 p refs Proposed for presentation at Winter Ann. Meeting of the ASME, Houston, Tex., 30 Nov. - 4 Dec. 1975
(NASA-TM-X-71777; E-8435) Avail: NTIS HC $3.25 CSCL 21E

Film cooling concepts applied to gas turbine vanes were investigated. The filming cooling air was ejected from a single row of holes on the convex surface and a double row of holes of the concave surface. Tests were conducted at a gas temperature of 1260 K, a gas pressure of 3 atmospheres, and a coolant temperature of 280 K. Mass velocity ratios were varied between 0 and 2.0. Data were taken without film cooling holes, with film cooling holes but without blowing, and with blowing. A small amount of blowing into a nonturbulent boundary layer caused an increase in vane temperatures. Film cooling when combined with convection cooling was verified to be more effective than either film or convection cooling alone. Author

N75-29108*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
APPLICATION OF REAL-TIME ENGINE SIMULATIONS TO THE DEVELOPMENT OF PROPULSION SYSTEM CONTROLS
J. R. Szuch 1975 13 p refs Proposed for Presentation at 11th Propulsion Conf., Anaheim, Calif., 29 Sep. - 1 Oct. 1975; cosponsored by AIAA and SAE
(NASA-TM-X-71764; E-8416) Avail: NTIS HC $3.25 CSCL 21E

The development of digital controls for turbojet and turbofan engines is presented by the use of real-time computer simulations of the engines. The engine simulation provides a test-bed for evaluating new control laws and for checking and debugging control software and hardware prior to engine testing. The development and use of real-time, hybrid computer simulations of the Pratt and Whitney TF30-P-3 and F100-PW-100 augmented turbofans are described in support of a number of controls research programs at the Lewis Research Center. The role of engine simulations in solving the propulsion systems integration problem is also discussed. Author

N75-29109*# Cincinnati Univ., Ohio. Dept. of Aerospace Engineering.
EROSION IN RADIAL INFLOW TURBINES. VOLUME 5: COMPUTER PROGRAMS FOR TRACING PARTICLE TRAJECTORIES Final Report
W. B. Clevenger, Jr. and W. Tabakoff May 1975 176 p refs (Grant NGR-36-004-055)
(NASA-CR-134787) Avail: NTIS HC $7.00 CSCL 21E

Computer programs used to study the trajectories of particles in the radial inflow turbines are presented. The general technique of each program is described. A set of subroutines developed during the study are described. Descriptions, listings, and typical examples of each of the main programs are included. Author

N75-29110*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POTENTIAL AND VISCOUS FLOW PREDICTION IN V/STOL PROPULSION SYSTEM INLETS
Norbert O. Stockman 1974 15 p refs Proposed for presentation at Workshop on Prediction Methods for Jet V/STOL propulsion Aerodynamics, Arlington, Va., 28-31 Jul. 1975; sponsored by the Naval Air Systems Command
(NASA-TM-X-71776; E-8434) Avail: NTIS HC $3.25 CSCL 21E

Highlights of the method of analysis of inlet flow are given. To indicate the accuracy of the method, several comparisons with experiments for different V/STOL inlet configurations and various operating conditions are given. Applications to inlet design and analysis are then discussed. A summary of current efforts is given, and areas of possible future work are indicated. Author

N75-29111# Aeronautical Research Labs., Melbourne (Australia).
AIRCRAFT ENGINE SPEED AND FUEL FLOW SIGNAL CONDITIONER WITH DIGITAL OUTPUT
K. F. Fraser Nov. 1974 44 p refs
(ARL/ME-Note-354) Avail: NTIS HC $3.75

Engine speed and fuel flow rate sensors typically provide outputs in the form of a pulse train with repetition rate proportional to the measurand. Digitization of such data is readily accomplished by counting the number of pulses received per unit time. A conditioner which produces such digitization is described. It has the special property that no pulses are ever missed when the contents of the counter are transferred to associated data recording equipment. Thus the conditioner can be used for accurate totalizing or engine revolutions of fuel consumed over long periods. Author

N75-29112*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
ANNOYANCE RESULTING FROM INTRUSION OF AIRCRAFT SOUNDS UPON VARIOUS ACTIVITIES Final Technical Report
Walter J. Gunn, William T. Shepherd, and John L. Fletcher (Memphis State Univ., Tenn.) 8 Aug. 1975 85 p refs
(Grant NGR-43-008-008) Avail: NTIS HC $4.75 CSCL 20A

An experiment was conducted in which subjects were engaged in TV viewing, telephone listening, or reverie (no activity) for a 1/2-hour session. During the session, they were exposed to a series of recorded aircraft sounds at the rate of one flight every 2 minutes. Within each session, four levels of flyover noise, separated by dB increments, were presented several times in a Latin Square balanced sequence. The peak level of the noisiest flyover in any session was fixed at 95, 90, 85, 75, or 70 dBA. At the end of the test session, subjects recorded their responses to the aircraft sounds, using a bipolar scale which covered the range from very pleasant to extremely annoying. Responses to aircraft noises were found to be significantly affected by the particular activity in which the subjects were engaged. Not all subjects found the aircraft sounds to be annoying. Author

N75-29113# H H Aerospace Design Co., Elmsford, N.Y.
SURVEY OF SONIC BOOM PHENOMENA FOR THE NON-SPECIALIST Final Report, Jun. 1974 - Feb. 1975
Simon Slutsky Feb. 1975 104 p refs
(Contract DOT-FA74WAI-468)
(AD-A009663; HHA-14; FAA-RD-75-68) Avail: NTIS HC $5.25 CSCL 20/1

The technical concepts in the field of sonic boom research are reviewed. A nontechnical discussion of acoustic mechanisms which are fundamental in sonic boom phenomena is included using photographs of water analogues. Basic concepts discussed include: sound generation, sound propagation, noise reduction, human response, structural and wildlife response, threshold Mach number operations, and simulation methods. Author

N75-29114# Advisory Group for Aerospace Research and Development, Paris (France).
TECHNICAL EVALUATION REPORT ON FLUID DYNAMICS PANEL SYMPOSIUM ON AIRFRAME/PROPULSION
E. C. Carter (Aircraft Res. Assoc., Bedford, Engl.) May 1975 14 p refs Symp. held at Rome, 3-6 Sep. 1974
(AGARD-AR-81) Avail: NTIS HC $3.25

Topics discussed at the symposium include: air intakes and airframe inlet interactions; nozzles/afterbodies flow field and airframe interference; wind tunnel testing and correlation with flight data; and integration design and accounting procedures. Main recommendations made are: there is urgent need for high quality afterbody pressure and force data; contradictory trends of drag with Reynolds number variation in windtunnel and flight must be resolved; the need for extended wind tunnel Reynolds number capability is again demonstrated; engine simulator techniques require development and validation; theoretical treatment of mixing of afterbody and jet flows and of afterbody distortion effects must be extended; theoretical treatment of intake buzz requires development. Author

N75-29115*# Tennessee Univ., Knoxville. Mechanical and Aerospace Engineering Dept.
NOISE SUPPRESSION WITH HIGH MACH NUMBER INLETS
Edward Lumsdaine, Jenn G. Cherng, Ismail Tag, and Lorenzo R. Clark (NASA. Langley Res. Center) 15 Jul. 1975 108 p refs
(Grant NsG-1081)
(NASA-CR-143314) Avail: NTIS HC $5.25 CSCL 20A

The parameters affecting the aerodynamic and acoustic performance of high Mach number inlets using the translating centerbody and fixed geometry configurations were studied along with the effects of area ratio, length/diameter ration, and lip geometry on the acoustic and aerodynamic performance when the rotor is at subsonic as well as supersonic tip speed. The results support earlier findings that the translating centerbody type inlet is superior to the collapsing cowl, both acoustically and aerodynamically, especially at moderately high area ratios. The length/diameter ratio does not seem to be as crucial to performance near choked flow as area ratio. Inlets operating at high Mach numbers are more effective in reducing high frequency noise. At choked flow, however, the low frequency noise is also effectively reduced. It is shown that the actual amount of noise reduction depends on the flow downstream of the throat (pressure recovery) in contradiction to inviscid theory. Choking does not guarantee a large amount of noise reduction if it is accompanied by high pressure loss. Thus, without boundary layer control, choked inlets are area ratio limited. Using the test results, an empirical formula was derived, relating the noise reduction to percent of maximum mass flow and pressure recovery. Author

N75-29116*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A COMPUTER PROGRAM FOR HELICOPTER ROTOR NOISE USING LOWSON'S FORMULA IN THE TIME DOMAIN
C. Lucille Parks 22 Jul. 1975 92 p refs
(NASA-TM-X-72759) Avail: NTIS HC $4.75 CSCL 20A

A computer program (D3910) was developed to calculate both the far field and near field acoustic pressure signature of a tilted rotor in hover or uniform forward speed. The analysis, carried out in the time domain, is based on Lowson's formulation of the acoustic field of a moving force. The digital computer program is described, including methods used in the calculations, a flow chart, program D3910 source listing, instructions for the user, and two test cases with input and output listings and output plots. Author

N75-29117*# Boeing Commercial Airplane Co., Seattle, Wash.
WIND TUNNEL TEST OF MODEL TARGET THRUST REVERSERS FOR THE PRATT AND WHITNEY AIRCRAFT JT8D-100 SERIES ENGINES INSTALLED ON A 727-200 AIRPLANE
D. Hambly Sep. 1974 157 p refs
(Contract NAS3-17842)
(NASA-CR-134709; D6-41900) Avail: NTIS HC $6.25 CSCL 21E

The results of a low speed wind tunnel test of 0.046 scale model target thrust reversers installed on a 727-200 model airplane are presented. The full airplane model was mounted on a force balance, except for the nacelles and thrust reversers, which were independently mounted and isolated from it. The installation had the capability of simulating the inlet airflows and of supplying the correct proportions of primary and secondary air to the nozzles. The objectives of the test were to assess the compatibility of the thrust reversers target door design with the engine and airplane. The following measurements were made: hot gas ingestion at the nacelle inlets; model lift, drag, and pitching moment; hot gas impingement on the airplane structure; and qualitative assessment of the rudder effectiveness. The major parameters controlling hot gas ingestion were found to be thrust reverser orientation, engine power setting, and the lip height of the bottom thrust reverser doors on the side nacelles. The thrust reversers tended to increase the model lift, decrease the drag, and decrease the pitching moment. Author

N75-29118*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EVALUATION BY STEP RESPONSE TESTS OF PROTOTYPE RELIEF VALVES DESIGNED FOR YF-12 INLET STABILITY BLEED SYSTEM
Miles O. Dustin and George H. Neiner Washington Aug. 1975

45 p refs
(NASA-TM-X-3262; E-8135) Avail: NTIS HC $3.75 CSCL 20D

Two stability bleed system relief valves were tested in a special dynamic test facility. These poppet valves are prototypes for a stability bleed system designed for use in a YF-12 flight inlet. One valve is unshielded, while the other has a special shield to eliminate the flow effect pressures on the piston. The tests determined the size of a damping orifice to be used during wind tunnel tests of the bleed system and verified an analog simulation of the valves. The effects of initial pressure level, pressure step size, and spring rate were investigated. Author

N75-29119*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
BASELINE MEASUREMENT OF THE NOISE GENERATED BY A SHORT-TO-MEDIUM RANGE JET TRANSPORT FLYING STANDARD ILS APPROACHES AND LEVEL FLYOVERS
Earl C. Hastings, Jr., Robert E. Shanks, and Arnold W. Mueller 4 Aug. 1975 62 p refs
(NASA-TM-X-72760) Avail: NTIS HC $4.25 CSCL 20A

The results of baseline noise flight tests are presented. Data are given for a point 1.85 kilometers (1.0 nautical mile) from the runway threshold, and experimental results of level flyover noise at altitudes of 122 meters (400 feet) and 610 meters (2,000 feet) are also shown for several different power levels. The experimental data are compared with data from other sources and reasonable agreement is noted. A description of the test technique, instrumentation, and data analysis methods is included. Author

N75-29120*# Scientific Translation Service, Santa Barbara, Calif.
CALCULATION OF AIRCRAFT ENGINE TURBINES. (GASDYNAMIC CALCULATION: BLADE PROFILING)
S. Z. Kopelev and N. D. Tikhonov Washington NASA Aug. 1975 330 p refs Transl. into ENGLISH of the book "Raschet Turbin Aviatsionnykh Dvigateley (Gazodinamicheskiy Raschet Profilirovaniye Lopatok)" Moscow, Mashinostroyeniye Press, 1974 p 1-268
(Contract NASw-2483)
(NASA-TT-F-16367) Avail: NTIS HC $9.50 CSCL 21E

A generalization is presented for various methods of gas-turbine design including an evaluation of methods of gasdynamic calculation of turbine stages, methods of blade profiling, and methods of calculating cooled blades. The size and weight characteristics of a turbine and their dependence on the main engine parameters are considered, and the relation between gasdynamic and strength parameters of a turbine is discussed, with allowance for its structural features and fabrication technology, paying special attention to choice of the layout and dimensions of the air-gas flow area and to the profiling of both nozzle and rotor blades. To facilitate understanding of the theory, and number of examples of specific calculations based on given numerical values of the initial parameters are presented which pertain to single-stage and multistage gas turbines of turbojet engines. Author

N75-29121*# United Air Lines, Inc., Chicago, Ill.
ENGINEERING SIMULATION EVALUATION OF THE TWO-SEGMENT NOISE ABATEMENT APPROACH IN THE DOUGLAS DC-8-61
W. E. Nylen 15 Apr. 1974 26 p
(Contract NAS2-7475)
(NASA-CR-137665) Avail: NTIS HC $3.75 CSCL 20A

The development and operational evaluation are discussed of a noise abatement two-segment approach which is safe and operationally acceptable for routine use in air carrier service. An engineering simulation evaluation was conducted; it was found that the entry speed and initial configuration are more important in the DC-8-61 than in the 727 because of the DC-8's aerodynamic cleanliness and drag programming constraints. It was also found that the altitude required for the DC-8 upper and lower transitions is less than the 727 transitions principally due to the pitching moment from the underslung DC-8 engines as compared to the 727 engines which produce no pitching moment with a change in thrust. The 727 approach was a reduced flaps (30 degrees) procedure with a 10-knot airspeed bleed in the lower transition; the DC-8 approach is a full flaps (50 degrees) procedure with constant airspeed established as soon as possible after upper segment transition. M.J.S.

N75-29122# National Aerospace Lab., Tokyo (Japan).
DIGITAL FUEL CONTROLLER FOR LIFT JET ENGINE
Kenji Nishio, Masanori Endo, Nanahisa Sugiyama, Takeshi Koshinuma, and Yukio Matsuda Sep. 1974 28 p refs In JAPANESE; ENGLISH summary
(NAL-TR-389) Avail: NTIS HC $3.75

A digital electronic engine controller with the on line control of lift jet engine JR-100H with a mini-computer is studied. The design program and fabrication of the demonstrator unit are described along with the test results of on line control of JR-100H. Author

N75-29123# Solar, San Diego, Calif.
HIGH TEMPERATURE SENSORS FOR ARMY GAS TURBINE ENGINES Final Report, Jun. 1973 - Aug. 1974
B. G. Buehler, D. A. Rohy, and W. A. Compton Nov. 1974 60 p refs
(Contract DAAJ02-73-C-0085; DA Proj. 1G1-62204-AA-71)
(AD-A005166; RDR-1780-2; USAAMRDL-TR-74-94) Avail: NTIS CSCL 21/5

The turbine blade temperature measuring system views the rotating turbine blades of a gas turbine engine, and by measuring the emitted, infrared radiation, it produces a processed signal directly proportional to the temperature of the blades. GRA

N75-29124# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
RAMJET TECHNOLOGY. CHAPTER 6: RAMJET FUELS
W. E. Wilson, Jr., L. L. Perini, and W. G. Berl Jun. 1974 71 p refs Revised
(Contract N00017-72-C-4401)
(AD-A006114; APL-TG-610-6-Rev) Avail: NTIS CSCL 21/5

Ramjet engine thrust depends on the acceleration of a working fluid by the addition of heat. The most practical method of heat addition is by the combustion of fuel in air, and the most commonly used fuels are storable liquid hydrocarbons. However, the effectiveness of the ramjet cycle is not restricted to this mode of heat supply or to this class of fuel, and other possibilities are discussed. Criteria for selecting a fuel, methods of calculating flame temperatures and specific impulse parameters, and prospects for obtaining fuels with improved performance are outlined. GRA

N75-29125# Colt Industries, Inc., West Hartford, Conn. Control Systems Div.
MINIATURIZED HIGH SPEED CONTROLS FOR TURBINE ENGINES FABRICATION AND TEST Final Report, May 1973 - Aug. 1974
D. G. Burnell, M. A. Cole, T. B. Morrison, A. H. White, and R. D. Zagranski Aug. 1974 205 p refs
(Contract F33615-73-C-2040; AF Proj. 3066)
(AD-A006108; AFAPL-TR-74-93) Avail: NTIS CSCL 21/5

This report summarizes the design and development of control components and high speed fuel pump technology for future drone, missile and RPV gas turbine engines. The hardware was designed for installation on an existing engine to provide a vehicle for control mode demonstration and evaluation testing. The developed hardware includes a fluidic/linear variable differential transformer delta P/P airflow sensor, a radiation pyrometer for sensing turbine blade temperature, three pressure transducers for sensing burner pressure (variable capacitance, strain gage, and potentiometric types), a 70,000 rpm centrifugal pump and proportional solenoid-operated fuel metering system, a magnetic clutch-driven 12,000 rpm gear pump for fuel metering and fuel pressurization, and an electronic unit for interfacing these components with an engine test cell digital computer. GRA

N75-29008* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
TRENDS IN AIRCRAFT NOISE CONTROL
Harvey H. Hubbard and Earl W. Conrad *In its* NASA/Univ. Conf. on Aeron. 1975 p 103-130 refs (For availability see N75-29001 20-01)
CSCL 01C

N75-29274 Loughborough Univ. of Technology (England). Dept. of Mathematics.
OPTIMAL CONTROL CONCEPTS IN THE DESIGN OF TURBINE BLADES AND BLADES
B. M. E. DeSilva *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 7, no. 5 May 1975 p 63-76 refs (For availability see N75-29272 20-31)

N75-29991 European Space Research Organization, Paris (France).
EXAMINATION OF COMBUSTION STABILITY IN A SWIRLING FLOW COMBUSTION CHAMBER
Andre Benoit, Gerard Collin, and Andre Mestre *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 85-114 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 37-48 (For availability see N75-29988 20-99)

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N75-29126*# Scientific Translation Service, Santa Barbara, Calif.
FLIGHT CONTROL AND THE EFFECTIVENESS OF AN AVIATION SYSTEM
V. V. Andreyevskiy and L. B. Goroshchenko Washington NASA Jul. 1975 264 p refs Transl. into ENGLISH of the book "Upravleniye Poletom i Effektivnost Aviatsionnogo Kompleksa" Moscow, Mashinostroyeniye Press, 1974 p 1-176
(Contract NASw-2483)
(NASA-TT-F-16262) Avail: NTIS HC $8.50 CSCL 01C

Methods are presented for evaluating the technical flight characteristics of an aviation complex in terms of the efficiency with which operations are performed. A valid reduction of the operational model and its stages was performed using methods based on guaranteed evaluations under indeterminate conditions. An examination was made of problems of selecting criteria for flight operation efficiency, compiling maneuvers which are optimum in terms of effectiveness, and formulating the trajectories as a whole. Methods are given for optimizing the trajectory in the case of additional relationships and limitations arising from the aircraft operation. Flight regimes, programs, and methods of controlling the aircraft when encountering or leaving a given point in space were examined. Author

N75-29127*# Southwest Research Inst., San Antonio, Tex.
A SIMULATION STUDY OF ACTIVE FEEDBACK SUPRESSION OF DYNAMIC RESPONSE IN HELICOPTER ROTOR BLADES Final Report
Daniel D. Kana, Roger L. Bessey, and Franklin T. Dodge 1 Jul. 1975 76 p refs
(Contract NAS1-12974; SwRI Proj. 02-3895)
(NASA-CR-132711) Avail: NTIS HC $4.75 CSCL 01C

A parameter study is presented for active feedback control applied to a helicopter rotor blade during forward flight. The study was performed on an electromechanical apparatus which included a mechanical model rotor blade and electronic analog simulation of interaction between blade deflections and aerodynamic loading. Blade response parameters were obtained for simulated vortex impinging at the blade tip at one pulse per revolution, and for a pulse which traveled from the blade tip toward its root. Results show that the response in a 1 - 10-per-rev frequency band is diminished by the feedback action, but at the same time responses at frequencies above 10-per-rev become increasingly more prominent with increased feedback amplitude, and can even lead to instability at certain levels. It appears that the latter behavior results from limitations of the laboratory simulation apparatus, rather than genuine potential behavior for a prototype helicopter. Author

N75-29128*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A THROAT-BYPASS STABILITY SYSTEM FOR A YF-12 AIRCRAFT RESEARCH INLET USING SELF-ACTING MECHANICAL VALVES
Gary L. Cole, Miles O. Dustin, and George H. Neiner 1975 14 p refs Proposed for presentation at 11th Propulsion on Conf., Anaheim, Calif., 29 Sep. - 1 Oct. 1975; cosponsored by AIAA and SAE
(NASA-TM-X-71779; E-8437) Avail: NTIS HC $3.25 CSCL 01C

Results of a wind tunnel investigation are presented. The inlet was modified so that airflow can be removed through a porous cowl-bleed region in the vicinity of the throat. Bleed plenum exit flow area is controlled by relief type mechanical valves. Unlike valves in previous systems, these are made for use in a high Mach flight environment and include refinements so that the system could be tested on a NASA YF-12 aircraft. The valves were designed to provide their own reference pressure. The results show that the system can absorb internal-airflow-transients that are too fast for a conventional bypass door control system and that the two systems complement each other quite well. Increased tolerance to angle of attack and Mach number changes is indicated. The valves should provide sufficient time for the inlet control system to make geometry changes required to keep the inlet started. Author

N75-29129# Bendix Corp., Teterboro, N.J. Flight Systems Div.
DIGITAL FLIGHT CONTROL SYSTEM REDUNDANCY STUDY Final Report, Mar. 1973 - May 1974
John McGough, Kurt Moses, Walter Platt, Gibson Reynolds, and John Strole Jul. 1974 341 p
(Contract F33615-73-C-3035; AF Proj. 1987)
(AD-A006411; AFFDL-TR-74-83) Avail: NTIS CSCL 01/3

Redundancy requirements and trade-off criteria are established for flight critical digital flight control systems with particular emphasis on the fly-by-wire application. The use of general purpose digital computers is considered, with self-test and cross-channel comparison monitoring techniques to obtain the necessary flight safety reliability. A reliability model is presented which includes the effects of detected and undetected failures and provides a basis for establishing in-flight and preflight test coverage requirements consistent with a given reliability goal. GRA

N75-29015* National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
STATUS AND TRENDS IN ACTIVE CONTROL TECHNOLOGY
Herman A. Rediess and Kenneth J. Szalai *In its* NASA/Univ. Conf. on Aeron. 1975 p 273-322 refs (For availability see N75-29001 20-01)
CSCL 01C

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N75-29130*# Grumman Aerospace Corp., Bethpage, N.Y.
USER'S GUIDE FOR A REVISED COMPUTER PROGRAM TO ANALYZE THE LRC 16 FOOT TRANSONIC DYNAMICS TUNNEL ACTIVE CABLE MOUNT SYSTEM
J. Chin and P. Barbero Jul. 1975 129 p refs
(Contract NAS1-10635)
(NASA-CR-132692) Avail: NTIS HC $5.75 CSCL 14B

The revision of an existing digital program to analyze the stability of models mounted on a two-cable mount system used in a transonic dynamics wind tunnel is presented. The program revisions and analysis of an active feedback control system to be used for controlling the free-flying models are treated. Author

N75-29131# Rome Air Development Center, Griffiss AFB, N.Y.
FAA LIGHTNING PROTECTION STUDY: LIGHTNING PROTECTION REQUIREMENTS FOR THE ARTS 3 SYSTEM Final Report, Jan. - Dec. 1974
David R. Wilkinson, Chin-Lin Chen, and Warren D. Peele Apr. 1975 37 p refs
(Contract DOT-FA72WAI-356)
(AD-A009662; FAA-RD-75-70) Avail: NTIS CSCL 01/5

The withstand capabilities and the protection requirement for solid-state and integrated circuits of a radar system susceptible to lightning-induced surges on the buried control and video cables are presented. Susceptible modules and components were identified from the circuit diagrams. The manufacturer's data sheets were used to establish the withstand capabilities of diodes and transistors. Methods are described to estimate the withstand capabilities of other electronic components. In particular, the pulse handling capabilities of resistors is discussed in detail. The withstand voltage levels for each susceptible module and component are treated. Author

N75-29132*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
SIMULATION VERIFICATION TECHNIQUES STUDY Final Report
P. B. Schoonmaker and T. H. Wenglinski 31 Mar. 1975 142 p refs
(Contract NAS9-13657)
(NASA-CR-144356; MDC-E-1246) Avail: NTIS HC $5.75 CSCL 14B

Results are summarized of the simulation verification techniques study which consisted of two tasks: to develop techniques for simulator hardware checkout and to develop techniques for simulation performance verification (validation). The hardware verification task involved definition of simulation hardware (hardware units and integrated simulator configurations), survey of current hardware self-test techniques, and definition of hardware and software techniques for checkout of simulator subsystems. The performance verification task included definition of simulation performance parameters (and critical performance parameters), definition of methods for establishing standards of performance (sources of reference data or validation), and definition of methods for validating performance. Both major tasks included definition of verification software and assessment of verification data base impact. An annotated bibliography of all documents generated during this study is provided. Author

N75-29133# Rome Air Development Center, Griffiss AFB, N.Y.
FAA LIGHTNING PROTECTION STUDY: LIGHTNING PROTECTION REQUIREMENTS FOR AIL MARK 1 INSTRUMENT LANDING SYSTEM Final Report, 1 Feb. 1974 - 1 Jan. 1975
Richard H. Hu, Andrew W. Revay, Jr., and Richard M. Cosel 1 Jan. 1975 56 p refs
(Contract DOT-FA72WAI-356)
(AD-A009342; FAA-RD-75-48) Avail: NTIS HC $4.25 CSCL 01/5

The degree of susceptibility of the Federal Aviation Administration electronic systems to induced electromagnetic pulse effects due to lightning is investigated and protective devices adequate for low voltage electronic systems are proposed. Specifically, the protection requirements for the AIL Mark 1 are determined. The types of susceptible components, methods used to determine their withstand capabilities, and recommendations for specific protection devices and circuitry are given. Author

N75-29134# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
POROUS FRICTION SURFACE COURSE Interim Report, Dec. 1971 - Sep. 1973
Thomas D. White Feb. 1975 118 p refs
(Contract DOT-FA71WAI-218)
(AD-A009012; FAA-RD-73-197) Avail: NTIS HC $5.25 CSCL 01/5

A study was conducted on the use of porous friction courses for airport pavements as a means of alleviating aircraft hydroplaning. The study consisted of a laboratory investigation of material requirements and mix design development, and of a field study of construction control, construction processes, and long-term performance. The laboratory results were correlated where possible with the field observations; satisfactory performance was obtained with a recommended aggregate gradation. A procedure for obtaining a design asphalt content and field mixing temperature, minimum field permeability values, and laboratory procedures for conducting permeability tests are described. A standard recommended guide specification is also included as an appendix. Author

N75-29135*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
EVALUATION AND STUDY OF ADVANCED OPTICAL CONTAMINATION, DEPOSITION, MEASUREMENT, AND REMOVAL TECHNIQUES Final Report
R. M. F. Linford, T. H. Allen, and C. F. Dillow May 1975 103 p
(Contract NAS9-13606)
(NASA-CR-144376; MDC-E1198) Avail: NTIS HC $5.25 CSCL 14B

A program is described to design, fabricate and install an experimental work chamber assembly (WCA) to provide a wide range of experimental capability. The WCA incorporates several techniques for studying the kinetics of contaminant films and their effect on optical surfaces. It incorporates the capability for depositing both optical and contaminant films on temperature-controlled samples, and for in-situ measurements of the vacuum ultraviolet reflectance. Ellipsometer optics are mounted on the chamber for film thickness determinations, and other features include access ports for radiation sources and instrumentation. Several supporting studies were conducted to define specific chamber requirements, to determine the sensitivity of the measurement techniques to be incorporated in the chamber, and to establish procedures for handling samples prior to their installation in the chamber. A bibliography and literature survey of contamination-related articles is included. Author

N75-29136# Rome Air Development Center, Griffiss AFB, N.Y.
FAA LIGHTNING PROTECTION STUDY: LIGHTNING PROTECTION REQUIREMENTS FOR WILCOX MARK I/C INSTRUMENT LANDING SYSTEM Final Report, 1 Feb. 1974 - 1 Jan. 1975
Richard H. Hu, Andrew W. Revay, Jr., and Richard M. Cosel Mar. 1975 79 p refs
(Contract DOT-FA72WAI-356)
(AD-A009010; FAA-RD-75-50) Avail: NTIS HC $4.75 CSCL 01/5

The purpose of the Lightning Protection Study is to determine the degree susceptibility of the Federal Aviation Administration electronic systems to induced electromagnetic pulse effects due to lightning, and to propose protective devices adequate for low voltage electronic systems. The lightning protection requirements, the types of susceptible components and methods used to determine their withstand capabilities and, finally, recommendations for specific protection devices and circuitry are described. A bibliography of sources used for reference and complete circuit and block diagrams of the affected sub-systems are included. Author

N75-29137*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.
AST-6/CSM TRAINING CONSOLE OPERATIONS MANUAL
R. Davis May 1975 17 p
(Contract NAS9-12200)
(NASA-CR-144370; LEC-60907) Avail: NTIS HC $3.25 CSCL 14B

The ATS-6/Command Service Module Training Console houses, controls, and cools telecommunication subsystems during support of ASTP test programs. The function of each switch on the power control and mode control panels is described along with the input functions on the stimulus input panel. The switch settings for each mode of operation are presented. Author

N75-29138# Calspan Corp., Buffalo, N.Y.
WIND TUNNEL MODEL DEFORMATION MEASURING SYSTEM Final Report, 6 Jul. - 1973 - 1 Aug. 1974
L. Bogdan, R. F. Drzewiecki, and G. R. Duryea Feb. 1975 89 p
(Contract F40600-73-C-0008)

(AD-A006390; CALSPAN-RK 5345-A-1; AEDC-TR-74-128) Avail: NTIS CSCL 14/2

This program was concerned with the feasibility study of an on-board type sensing technique capable of accurately measuring the deformation of wind tunnel models undergoing test in the operational environment of high Reynolds number wind tunnel (HIRT). Analytical and experimental investigations were devoted to establishing the utility of a strain-gage probe type of sensor for the measurement of the deflection and twist occurring in model wings as the result of aerodynamic loading. GRA

N75-29994 European Space Research Organization, Paris (France).
A NEW TRANSIENT SIGNAL ANALYSIS UNIT
Michel Mathurin and Claude Christoux *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 160-165 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 67-68
(For availability see N75-29988 20-99)

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

No abstracts in this category.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N75-29139 British Library Lending Div., Boston Spa (England).
SPACESHIP SOYUZ-17 IN ORBIT. TASS ANNOUNCEMENT
13 Jan. 1975 3 p Transl. into ENGLISH from Pravda, 12-13 Jan. 1975
(BLL-M-23714-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 1 BLL photocopy coupon

The flight program of Soyuz 17 which includes joint experiments with Salyut 4, check up of onboard systems, and stable radio and television communication with the crew is described along with the docking of the two spacecraft. J.M.S.

N75-29140*# Kanner (Leo) Associates, Redwood City, Calif.
SOYUZ 14: SALYUT-3 FLIGHT
A. A. Bachmanov, B. N. Zheleznov, and C. A. Romanov Washington NASA Jul. 1975 18 p Transl. into ENGLISH from selected articles from Russian newspapers, 1974-1975
(Contract NASw-2481)
(NASA-TT-F-16466) Avail: NTIS HC $3.25 CSCL 22A

The Soyuz 14 docking with the Salyut 3 in June-July, 1974 is discussed. Experiments made as well as improvements tested on the Salyut 3 systems are included. The Salyut 3 'double' which is used for running programs, developing procedures, and solving problems is described along with the living and working arrangements of the Salyut 3. Author

N75-29141*# Saad Publications, Karachi (Pakistan).
STUDY OF OUTER SPACE BY REACTION DEVICES
K. E. Tsiolkovskiy Washington NASA Aug. 1975 741 p Transl. into ENGLISH of the book "Issledovaniye Mirovykh Prostranstv Reaktivnymi Priborami" Moscow, Mashinostroyeniye Press, 1967 p 1-375
(Contract NSF C-505)
(NASA-TT-F-15571) Avail: NTIS HC $17.25 CSCL 22A

A classical, comprehensive collection of theoretical studies on interplanetary space travel, jet propulsion, and rocket technology is presented. Topics treated are: (1) escape velocity; (2) trajectories; (3) design considerations; (4) fuels; (5) food supplies and spacecraft environment during spaceflight; and (6) the general mechanics of spaceflight. J.R.T.

N75-29142*# Joint Publications Research Service, Arlington, Va.
STELLAR DIARY
N. N. Denisov Washington NASA Jul. 1975 110 p Transl. into ENGLISH of the book "Zvezdnyy Dnevnik" Moscow, Znaniye Press, 1974 p 1158
(NASA Order W-13183)
(NASA-TT-F-16376) Avail: NTIS HC $5.25 CSCL 22A

Soviet manned space missions up to and including Soyuz 13 are discussed. Biographies of the Soviet cosmonauts and a nontechnical description of launch and recovery activities are included as well as cosmonaut activities in orbit and impressions of space flight. Author

N75-29143*# Joint Publications Research Service, Arlington, Va.
A MONTH ON SALYUT-4
A. Gubarev Washington NASA Jul. 1975 6 p Transl. into ENGLISH from Aviat. Kosmonavt. (USSR), no. 3, Mar. 1975 p 44-45
(NASA-TT-F-16419) Avail: NTIS HC $3.25 CSCL 22A

Experiments carried out aboard the Salyut-4 are described. Some station parameters are discussed. The experiments described include the cultivation of crops, medical research, use of an infrared telescope, registry of solar flares, and use of an X-ray telescope. Author

N75-29144*# Saad Publications, Karachi (Pakistan).
MASTERY OF OUTER SPACE IN THE USSR, 1957 - 1967
G. A. Skuridin, ed. Washington NASA Aug. 1975 1291 p Transl. into ENGLISH of the book "Osvoyeniye Kosmicheskogo Prostranstva v SSSR, 1957 - 1967" Moscow, Nauka Press, 1971 p 1-554 Sponsored in part by NASA
(Contract NSF C-505)
(NASA-TT-F-16516; TT-74-53010) Avail: NTIS HC $33.25 CSCL 22A

A volume containing material on space-rocket subjects connected with the mastering of cosmic space by the Soviet Union, published in Central news-papers from 1957-1967 is presented. All the material of the volume is collected into several chapters, reflecting the main trend of cosmic investigations. Author

N75-29145*# Lockheed Electronics Co., Houston, Tex.
USERS GUIDE FOR THE SHUTTLE MASS PROPERTIES AUTOMATED SYSTEM
R. G. Hamil Jun. 1975 104 p
(Contract NAS9-12200)
(NASA-CR-144371; LEC-6408; JSC-09781) Avail: NTIS HC $5.25 CSCL 22A

A set of programs developed for use on the JSC Univac 1100 series computers and designed to automate the collection and processing of data into the mass properties section of the shuttle operational data book is described. Author

N75-29146# British Aircraft Corp. (Operating) Ltd., Bristol (England). Electronics and Space Systems Group.
SATELLITE OPERATIONS MODEL EXTENSION Final Report
P. J. F. Millier, comp. 20 Dec. 1974 49 p refs
(Contract ESOC-TA/90/73-AR)
(ESS/SS-617; ESRO-CR(P)-647) Avail: NTIS HC $3.75

A digital model of the COS-B spacecraft was developed, with investigation into the basic requirements of a close loop model using the HEOS-A2 power supplies as a basis. The model comprises two segments; the setup segment responsible for setting parameters (orbit, attitude, and thermal control) to their starting values, and the run segment simulating the temporal progress of the satellite. The model is described, and failure cases in the COS-B model are presented. It is concluded that the COS-B model telemetry data is realistically comparable with the COS-B satellite telemetry data; the closed loop form of operation provides a greater degree of simulation realism than the open loop system. The COS-B model could be adapted to simulate other satellites such as Meteosat and GEOS. Some improvements are suggested. ESRO

N75-29147# Royal Aircraft Establishment, Farnborough (England).
THE SKYNET 2 ATTITUDE SENSOR PREDICTION AND EVENTS PROGRAM WINK 2
G. J. Davison Oct. 1974 143 p refs
(RAE-TR-74091; BR44085) Avail: NTIS HC $5.75

A detailed description is given of a computer program, which is used to provide predictions of the SKYNET2 attitude sensor data, and also to list the times at which interference with the earth sensors by the sun or moon is expected to occur. Author (ESRO)

N75-29148# Royal Aircraft Establishment, Farnborough (England).
ANALYSIS OF THE ORBIT OF ARIEL 1, 1962-15A, NEAR 15TH-ORDER RESONANCE
Doreen M. C. Walker Sep. 1974 20 p refs
(RAE-TR-74107; BR43094) Avail: NTIS HC $3.25

Ariel 1, the first international satellite, was launched on 26 April 1962, into an orbit inclined at 53.85 deg to the equator, with an initial perigee height near 390 km. On 8 May 1973 the orbit passed through 15th-order resonance and was determined, with an orbit refinement program, at eight epochs between February and August 1973 using about 500 observations. The orbital inclinations during the time of 15th-order resonance, as given by these eight orbits and 31 U.S. Navy orbits, were fitted with a theoretical curve using a computer program. The values of eccentricity were also successfully fitted using the computer program and the results are discussed. Author (ESRO)

N75-29149# Royal Aircraft Establishment, Farnborough (England).
ORBITAL REQUIREMENTS FOR THE ASTRONOMICAL ROENTGEN OBSERVATORY SATELLITE
G. E. Cook and M. D. Palmer Oct. 1974 38 p refs
(RAE-TR-74110; BR43678) Avail: NTIS HC $3.75

A preliminary examination was made of the orbital requirements for the satellite. The preferred orbit has a large eccentricity, a near-polar inclination, and perigee near the southern apex. The orbital stability is dominated by the very-long-term luni-solar perturbations which depend mainly on the orientation of the orbit with respect to the orbital planes of the disturbing bodies. There is no difficulty in satisfying the experimental requirements for a mission duration of one year. If a lifetime of four years is required, the launch time must be carefully selected or the orbit must be slightly modified. Short closures in the launch window can arise, possibly with a frequency of twice per lunar month. Author (ESRO)

N75-29150# Royal Aircraft Establishment, Farnborough (England).
THE EVOLUTION OF THE PROP6 ORBIT DETERMINATION PROGRAM AND RELATED TOPICS
R. H. Gooding Dec. 1974 89 p refs
(RAE-TR-74164; BR44993) Avail: NTIS HC $4.75

The orbit generator of the orbit determination program PROP is documented and compared with the generators of other programs in use. A synopsis is given of all the other changes since PROP3, and of changes in the related FORTRAN programs PREP and ORES. Some basic information is given for another program in the same family, PRAP, and details are presented on the way in which the programs were implemented. Other topics discussed include the effect on PROP runs of the use of satellite observations based on UTC as reference, the effect of the earth's precession on a satellite's orbital elements, and various aspects of the differential correction process as used in PROP. Author (ESRO)

N75-29151# Army Foreign Science and Technology Center, Charlottesville, Va.
CALCULATION OF CHANGES IN THE PERIOD OF A SATELLITE BASED ON SYNCHRONOUS VISUAL OBSERVATIONS
M. Ill 30 May 1974 10 p refs Transl. into ENGLISH from Pozorovani Umelych Druzic Zeme (Czechoslovakia), no. 4, 1965 p 104-112
(AD-A006095; FSTC-HT-23-0407-74) Avail: NTIS CSCL 22/3

A description is given for determining the draconic period and acceleration of satellites. The acceleration can be calculated to within an accuracy of 0.001 sec if the interval between passages is not less than two days. As this interval increases, the accuracy also is increased. GRA

N75-29152# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
INTERACTIONS BETWEEN SAS-C SPACECRAFT NUTATIONS AND SPIN-RATE CONTROL SYSTEM
B. E. Tossman and D. L. Thayer Aug. 1974 58 p refs
(Contract N00017-72-C-4401)
(AD-A006115; APL-TG-1254) Avail: NTIS CSCL 22/1

The SAS-C spacecraft is stabilized by a momentum biased reaction wheel and passive nutation damper. A closed-loop low-speed spacecraft spin rate control system is included which uses a single-axis gyro and a variable speed range on the reaction wheel. Dynamic instability can result from interactions among the gyro, damper, and spacecraft dynamic unbalance that are aggravated by gyro angular misalignment, gyro error signals, and spacecraft nutations. This report presents analytic, eigenvector, and digital computer dynamical analyses of the coupled systems describing mechanisms for instability; bounds on gyro error signal, tilt, and spacecraft dynamic unbalance that ensure system stability; and expected spin rate control system performance. GRA

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air)*.

N75-29153*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
PREMISSION AND POSTMISSION SIMULATION STUDIES OF THE FOOT-CONTROLLED MANEUVERING UNIT FOR SKYLAB EXPERIMENT T-020
Donald E. Hewes and Kenneth E. Glover Washington Aug. 1975 72 p refs
(NASA-TN-D-7963; L-10070) Avail: NTIS HC $4.25 CSCL 05H

A Skylab experiment was conducted to study the maneuvering capabilities of astronauts using a relatively simple self-locomotive device, referred to as the foot-controlled maneuvering unit, and to evaluate the effectiveness of ground-based facilities simulating the operation of this device in weightless conditions of space. Some of the special considerations given in the definition and development of the experiment as related to the two ground-based simulators are reviewed. These simulators were used to train the test subjects and to obtain baseline data which could be used for comparison with the in-flight tests that were performed inside the Skylab orbital workshop. The results of both premission and postmission tests are discussed, and subjective comparisons of the in-flight and ground-based test conditions are presented. Author

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N75-29154+ Mitre Corp., McLean, Va.
AERONAUTICAL SATELLITE (AEROSAT) PROGRAM RELATED BIBLIOGRAPHY Final Report
Y. Kaminsky Nov. 1974 77 p refs
(AD-A005987; MTR-6609; FAA-EM-74-16) Avail: NTIS HC $4.75 CSCL 22/1

A bibliography of documents having a direct or indirect bearing on the various aspects of the Aeronautical Satellite (AEROSAT) Program is presented. The documents are the references on file in the MITRE AEROSAT/QSATS Group and do not represent an exhaustive listing of documents of other MITRE groups, government agencies, industrial companies, or library listings. The bibliography is divided into five sections: reports, memoranda, briefings, technical articles, and conference papers. There are 650 references. Author

N75-29155*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COST PERFORMANCE SATELLITE DESIGN USING QUEUEING THEORY
Gerald F. Hein 1975 35 p refs Presented at 6th Ann. Simulation Conf., Pittsburgh, 24-25 Apr. 1975; sponsored by IEEE and Univ. of Pittsburgh
(NASA-TM-X-71770; E-8044) Avail: NTIS HC $3.75 CSCL 22A

The Poisson arrival model was used to determine the effects of limiting the number of channels for a disaster warning satellite. State probabilities and delay probabilities were estimated for several values of the number of channels (C) for arrival and service rates obtained from disaster warnings issued by the National Weather Service. The results predicted by the queueing model were compared with the results of a digital computer simulation. Author

N75-29156*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTOMATED MARS SURFACE SAMPLE RETURN MISSION CONCEPTS FOR ACHIEVEMENT OF ESSENTIAL SCIENTIFIC OBJECTIVES
William L. Weaver, Harry N. Norton, and Wayne L. Darnell Washington Jun. 1975 160 p refs
(NASA-TM-X-3184; L-9847) Avail: NTIS HC $6.25 CSCL 22A

Mission concepts were investigated for automated return to Earth of a Mars surface sample adequate for detailed analyses in scientific laboratories. The minimum sample mass sufficient to meet scientific requirements was determined. Types of materials and supporting measurements for essential analyses are reported. A baseline trajectory profile was selected for its low energy requirements and relatively simple implementation, and trajectory profile design data were developed for 1979 and 1981 launch opportunities. Efficient spacecraft systems were conceived by utilizing existing technology where possible. Systems concepts emphasized the 1979 launch opportunity, and the applicability of results to other opportunities was assessed. It was shown that the baseline missions (return through Mars parking orbit) and some comparison missions (return after sample transfer in Mars orbit) can be accomplished by using a single Titan III E/Centaur as the launch vehicle. All missions investigated can be accomplished by use of Space Shuttle/Centaur vehicles.
Author

N75-29157# Royal Aircraft Establishment, Farnborough (England).
MATHEMATICAL MODELLING OF THE RAE LIGHTWEIGHT FLEXIBLE SOLAR ARRAY
R. N. A. Plimmer Oct. 1974 22 p refs Presented at the 6th IFAC Symp. on Control in Space, Tsakhkadzor, USSR, 26-31 Aug. 1974
(RAE-TR-74112; BR43578) Avail: NTIS HC $3.25

Development of a mathematical model for the attitude dynamics of a spacecraft equipped with a lightweight flexible solar array of RAE design is described. The theory was developed using a continuous mechanics approach and a computer program prepared to generate the lateral bending modes of a spacecraft comprising a rigid central structure carrying a pair of solar arrays symmetrically situated about the central body. Furthermore, the program generates the effective inertia and mass as a function of the forcing frequency. These are formulated in the form of transfer functions which are more convenient for control problem analysis. The following models are considered: a model that assumes the array cross members are rigid, and a model that takes account of the flexibility of the cross members. Author (ESRO)

N75-29158# European Space Research and Technology Center, Noordwijk (Netherlands).
ESRO-4 MISSION AND OPERATIONAL PROGRAMME
L. M. Palenzona and P. J. Berlin Paris ESRO Dec. 1974 81 p
(ESRO-TN-116-ESTEC) Avail: NTIS HC $4.75

The basic program for orbital operations of the satellite is described together with an outline of contingencies and failure cases. The ESRO 4 scientific experiments, operational capabilities and constraints of the spacecraft, the orbit, and an analysis of launch constraints leading to the definition of the launch windows are summarized. Author (ESRO)

N75-29159# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
AFCRL CONTRIBUTIONS TO THE NATIONAL GEODETIC SATELLITE PROGRAM (NGSP) Air Force Surveys in Geophysics
George Hadigeorge, Theodore E. Wirtanen, Robert L. Iliff, Donald H. Eckhardt, and Duane C. Brown 2 May 1974 143 p refs (AF Proj. 7600)
(AD-A006110; AFCRL-AFSIG-287; AFCRL-TR-74-0217) Avail: NTIS CSCL 08/5

Contents: The use of artificial satellites for geodesy; Satellite and ground instrumentation; AFCRL laser-satellite geodesy; AFCRL geodetic dual laser system; intervisible (geometric) adjustment theory; Short arc geodetic adjustment (SAGA) theory; geometric results from geodetic satellite (ANNA 1B) optical data; improvement of the GEOS-1 North American tracking network from multiple short arc geodetic adjustments; near term prospects for positional accuracies of 0.1 to 1.0 meters from satellite geodesy; results from simulations of continuously integrated Doppler for precise aircraft positioning; simultaneous recovery of satellite and station positions utilizing the short arc method; least-squares collocation method for combination of satellite-derived gravitational and terrestrial gravity. GRA

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

No abstracts in this category.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N75-29160*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
COMBINED DOCKING AND GRASPING DEVICE Patent Application
John L. Burch and James D. Johnston, inventors (to NASA) Filed 7 Aug. 1975 14 p
(NASA-Case-MFS-23088-1; US-Patent-Appl-SN-602617) Avail: NTIS HC $3.25 CSCL 22B

A combined docking and grasping manipulator arm device is described. The device is comprised of a single manipulator arm for both docking and for performing general work between orbital vehicles and orbital payloads. NASA

N75-29161*# Hughes Aircraft Co., El Segundo, Calif.
EXPERIMENT DEFINITION PHASE SHUTTLE LABORATORY: LDRL-10.6 EXPERIMENT Quarterly Report, 27 Mar. - 26 Jun. 1975
15 Jul. 1975 34 p
(Contract NAS5-20018)
(NASA-CR-144658; QR-4) Avail: NTIS HC $3.75 CSCL 22B

Progress is reported in the development of the space shuttle laboratory laser data relay link. The system transmittance of various surfaces was considered in order to examine the coating tradeoffs for the beryllium mirrors. The results of six coating combinations considered are summarized. It is recommended that silver coatings be used throughout the system. Design of the pre-expander and a preliminary alignment procedure implemented to align all optical elements to the reference mechanical axis (the rotational axis of the outer gimbal bearing located between the two Gregorian telescopes) are included. The local oscillator subsystem, consisting of the laser, Stark cell, Stark cell electronics, power supply, starting circuit, and conditioning optics were completed and installed in the optimechanical subsystem and operation against a 10.6 micrometer source was attempted. Preliminary measurements of the HgCdTe mixer showed that this critical element was inoperative and in subsequent tests the receiver front end electronics had also failed. Possible reasons for these failures and corrective action and steps to prevent future recurrence are discussed. J.M.S.

N75-29162*# Pennsylvania Univ., Philadelphia. Moore School of Electrical Engineering.
SPACE SHUTTLE ELECTROMAGNETIC ENVIRONMENT EXPERIMENT. PHASE A: DEFINITION STUDY Preliminary Report, 3 Sep. - 3 Dec. 1974
Fred Haber, R. M. Showers, S. H. Taheri, L. A. Forrest, Jr., and Christopher Kocher 3 Dec. 1974 69 p refs
(Contract NAS5-20707)
(NASA-CR-143834; Rept-75-04) Avail: NTIS HC $4.25 CSCL 22B

A program is discussed which develops a concept for measuring the electromagnetic environment on earth with equipment on board an orbiting space shuttle. Earlier work on spaceborne measuring experiments is reviewed, and emissions to be expected are estimated using, in part, previously gathered data. General relations among system parameters are presented, followed by a proposal on spatial and frequency scanning concepts. The methods proposed include a nadir looking measurement with small lateral scan and a circularly scanned measurement looking tangent to the earth's surface at the horizon. Antenna requirements are given, assuming frequency coverage from 400 MHz to 40 GHz. For the low frequency range, 400-1000 MHz, a processed, thinned array is proposed which will be more fully analyzed in the next phase of the program. Preliminary hardware and data processing requirements are presented. Author

N75-29163*# Chrysler Corp., New Orleans, La. Data Management Services.
REENTRY STATIC STABILITY CHARACTERISTICS OF A (MODEL 471) .005479-SCALE 146-INCH SOLID ROCKET BOOSTER TESTED IN THE NASA/MSFC 14 BY 14 INCH TWT (SA8F)
J. D. Johnson (NASA Marshall Space Flight Center), W. F. Braddock (Northrop Services Inc., Huntsville, Ala.), and Sarat C. Praharaj (Northrop Services Inc., Huntsville, Ala.) Jul. 1975 897 p refs
(Contract NAS9-13247)
(NASA-CR-141549; DMS-DR-2223) Avail: NTIS HC $19.25 CSCL 22B

A force test of a scale model of the Space Shuttle Solid Rocket Booster was conducted in a trisonic wind tunnel. The model was tested with such protuberances as a camera capsule, electrical tunnel, attach rings, aft separation rockets, ET attachment structure, and hold-down struts. The model was also tested with the nozzle at gimbal angles of 0, 2.5, and 5 degrees. The influence of a unique heat shield configuration was also determined. Some photographs of model installations in the tunnel were taken and are included. Schlieren photography was utilized for several angles of attack. Author

N75-29164*# Hughes Aircraft Co., Culver City, Calif. Space and Communications Group.
EXPERIMENT DEFINITION PHASE SHUTTLE LABORATORY LDRL-10.6 EXPERIMENT Quarterly Report, 26 Dec. 1974 - 26 Mar. 1975
15 Apr. 1975 124 p
(Contract NAS5-20018)
(NASA-CR-144656; D0824; SCG-50150R; QR-3) Avail: NTIS HC $5.25 CSCL 22B

The 10.6 microns laser data relay link (LDRL 10.6) program was directed to applying optical communications to NASA's wideband data transmission requirements through the 1980's. The LDRL consists of a transmitter on one or more low earth orbit satellites with an elliptical orbit satellite receivers. Topics discussed include: update of the LDRL design control table to detail the transmitter optical chain losses and to incorporate the change to a reflective beam pre-expander; continued examination of the link establishment sequence, including its dependence upon spacecraft stability; design of the transmitter pointing and tracking control system; and finalization of the transmitter brassboard optical and mechanical design. M.J.S.

N75-29165*# Chrysler Corp., New Orleans, La.
DIFFERENTIAL ELEVON EFFECTIVENESS LATERAL CONTROL OPTIMIZATION AND ELEVON HINGE MOMENT INVESTIGATION ON A 0.015 SCALE SPACE SHUTTLE ORBITER MODEL 49-0 (140A/B/C MODIFIED) IN THE AECD VKF WIND TUNNEL A (0A115)
V. Esparza (Rockwell Intern. Corp., Downey, Calif.) Jun. 1975 521 p
(Contract NAS9-13247)
(NASA-CR-141534; DMS-DR-2198) Avail: NTIS HC $12.25 CSCL 22B

Experimental aerodynamic investigations were conducted in the Arnold Engineering Development Center (AEDC) Von Karman Facility Tunnel A on a scale model of the space shuttle orbiter. The objectives of this test were: (1) determine supersonic differential elevon/aileron lateral control optimization, (2) determine supersonic elevon hinge moments, (3) determine the supersonic effects of the new baseline 6-inch elevon/elevon and elevon/fuselage gaps, and 4) determine the supersonic effects of the new short (VL70-008410) OMS pods. Six-component aerodynamic force, moment, and elevon hinge moment data were recorded. Author

N75-29166*# TRW Systems Group, Houston, Tex.
THE RELATIVE EFFECTS OF ENTRY PARAMETERS ON THERMAL PROTECTION SYSTEM WEIGHT
P. N. Hirasaki 20 Dec. 1971 50 p refs
(Contract NAS9-12330)
(NASA-CR-144386; TRW-20029-H017-R0-00) Avail: NTIS HC $3.75 CSCL 22B

Shielding a spacecraft from the severe thermal environment of an atmospheric entry requires a sophisticated thermal protection system (TPS). Thermal computer program models were developed for two such TPS designs proposed for the space shuttle orbiter. The multilayer systems, a reusable surface insulation TPS, and a re-radiative metallic skin TPS, were sized for a cross-section of trajectories in the entry corridor. This analysis indicates the relative influence of the entry parameters on the weight of each TPS concept. The results are summarized graphically. The trajectory variables considered were down-range, cross-range, orbit inclination, entry interface velocity and flight path angle, maximum heating rate level, angle of attack, and ballistic coefficient. Variations in cross-range and flight path angle over the ranges considered had virtually no effect on the

required entry TPS weight. The TPS weight was significantly more sensitive to variations in angle of attack than to dispersions in the other trajectory considered. Author

N75-29167# Societe Nationale Industrielle Aerospatiale, Cannes (France). Div. Systemes Balistiques et Spatiaux.
VIBRATION DAMPING OF SATELLITE STRUCTURES Final Report [RECHERCHE SUR L'AMORTISSEMENT EN VIBRATION DES STRUCTURES DE SATELLITE]
J. Loup 15 Oct. 1974 96 p In FRENCH
(Contract ESTEC-2114/73-PP)
(Rept-251-CA/53; ESRO-CR(P)-633) Avail: NTIS HC $4.75

The influence of satellite components on vibration damping was studied, along with various configurations on an ITOS-A structure. The computation method is outlined together with participation factors and computed amplifications. Test results are discussed with regard to resonant frequencies, linearity, damping variation, correlation between measured and computed frequencies, and amplifications. A comparison was made for the damping variation between the structural model and the flight model. ESRO

N75-29168# Societe Nationale Industrielle Aerospatiale, Cannes (France). Div. Systemes Balistiques et Spatiaux.
VIBRATION DAMPING OF SATELLITE STRUCTURES. REPORT ON TESTS [RECHERCHE SUR L'AMORTISSEMENT EN VIBRATION PRESENTE PAR LES STRUCTURES DE SATELLITES. RAPPORT D'ESSAIS]
[1974] 124 p In FRENCH
(Contract ESTEC-2114/73-PP)
(Rept-828-CA/40; ESRO-CR(P)-634) Avail: NTIS HC $5.25

The experimental part of the structural vibration tests for the ITOS A satellite is presented. The experimental device used is outlined together with the various satellite configurations and simulated elements. The test program is described. Results are given in tabular and graphic form. ESRO

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

N75-29169*# General Electric Co., Houston, Tex.
SHUTTLE CHECKOUT SOFTWARE SYSTEM APPLICATION VERIFICATION LABORATORY MANUAL Final Report
Jul. 1975 16 p refs
(Contract NAS9-12402-061)
(NASA-CR-144378) Avail: NTIS HC $3.25 CSCL 22B

Specifications of computer programs and simulation tests are described. Samples of input forms are shown, and flow charts are also included. J.R.T.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N75-29170*# Northrop Services, Inc., Huntsville, Ala.
MISSION ROLES FOR THE SOLAR ELECTRIC PROPULSION STAGE WITH THE SPACE TRANSPORTATION SYSTEM
3 Dec. 1974 63 p refs
(Contract NAS8-30742)
(NASA-CR-120664) Avail: NTIS HC $4.25 CSCL 21C

A briefing outline is presented of the mission roles for the solar electric propulsion stage (SEPS). Topics outlined include operational considerations and mission characteristics, trade studies and technology assessments influencing SEPS configuration definition, program support requirements, and development and operations cost estimates. M.J.S.

N75-29171*# Kanner (Leo) Associates, Redwood City, Calif.
OPTIMIZATION OF PLANE FIN-TUBE RADIATOR FOR SPACECRAFT ENERGY SUPPLY
Guenter Woessner Washington NASA Aug. 1975 140 p refs Transl. into ENGLISH of the book "Optimale Auslegung von ebenen Rippenrohr-Radiatoren fuer Energieversorgungsanlagen von Raumfluggeraeten" West Germany, 1970 164 p
(Contract NASw-2790)
(NASA-TT-F-16473) Avail: NTIS HC $5.75 CSCL 10C

The optimal design of a cooling circuit for a spacecraft power supply with plane fin-tube radiators is investigated regarding minimal mass/electric power ratio. As pressure losses decisively influence the optimal design of the radiator equipment, the determination of flow behavior in the radiator tube register is extensively treated. Author

N75-29172*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POWER PROCESSING FOR ELECTRIC PROPULSION
R. C. Finke, B. G. Herron (Hughes Res. Labs., Malibu, Calif.), and G. D. Gant (EOX, Xerox Corp.) 1975 22 p Proposed for presentation at Electron. and Aerospace Systems Conf. (EASCON), Washington, D. C., 28 Sep. - 1 Oct. 1975; sponsored by IEEE
(NASA-TM-X-71775; E-8429) Avail: NTIS HC $3.25 CSCL 21C

The inclusion of electric thruster systems in spacecraft design is considered. The propulsion requirements of such spacecraft dictate a wide range of thruster power levels and operational lifetimes, which must be matched by lightweight, efficient, and reliable thruster power processing systems. Electron bombardment ion thruster requirements are presented, and the performance characteristics of present power processing systems are reviewed. Design philosophies and alternatives in areas such as inverter type, arc protection, and control methods are discussed along with future performance potentials for meeting goals in the areas of power process or weight (10 kg/kW), efficiency (approaching 92 percent), reliability (0.96 for 15,000 hr), and thermal control capability (0.3 to 5 AU). Author

N75-29173*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROPULSION TECHNOLOGY NEEDS FOR ADVANCED SPACE TRANSPORTATION SYSTEMS
John W. Gregory 1975 30 p refs To be presented at 11th Propulsion Conf., Anaheim, Calif., 29 Sep. - 1 Oct. 1975; sponsored by AIAA and Soc. of Automotive Engr.
(NASA-TM-X-71783; E-8443) Avail: NTIS HC $3.75 CSCL 21H

Plans are formulated for chemical propulsion technology programs to meet the needs of advanced space transportation systems from 1980 to the year 2000. The many possible vehicle applications are reviewed and cataloged to isolate the common threads of primary propulsion technology that satisfies near term requirements in the first decade and at the same time establish the technology groundwork for various potential far term applications in the second decade. Thrust classes of primary propulsion engines that are apparent include: (1) 5,000 to 30,000 pounds thrust for upper stages and space maneuvering; and (2) large booster engines of over 250,000 pounds thrust. Major classes of propulsion systems and the important subdivisions of each class are identified. The relative importance of each class is discussed in terms of the number of potential applications, the likelihood of that application materializing, and the criticality of the technology needed. Specific technology programs are described and scheduled to fulfill the anticipated primary propulsion technology requirements. Author

N75-29174*# IBM Federal Systems Div., Huntsville, Ala.
LOW COST COMPUTER SUBSYSTEM FOR THE SOLAR ELECTRIC PROPULSION STAGE (SEPS)
1 May 1975 169 p refs
(Contract NAS8-30749)
(NASA-CR-120671; IBM-75W-00041) Avail: NTIS HC $6.25 CSCL 21C

The Solar Electric Propulsion Stage (SEPS) subsystem which

consists of the computer, custom input/output (I/O) unit, and tape recorder for mass storage of telemetry data was studied. Computer software and interface requirements were developed along with computer and I/O unit design parameters. Redundancy implementation was emphasized. Reliability analysis was performed for the complete command computer subsystem. A SEPS fault tolerant memory breadboard was constructed and its operation demonstrated. J.M.S.

N75-29175*# Colorado State Univ., Fort Collins. Dept. of Physics.

CHARGE-EXCHANGE PLASMA GENERATED BY AN ION THRUSTER Annual Report, 1 Jul. 1974 - 30 Jun. 1975

Harold R. Kaufman Jun. 1975 44 p refs
(Grant NsG-3038)
(NASA-CR-134844) Avail: NTIS HC $4.25 CSCL 21C

The use of high voltage solar arrays greatly reduces or eliminates power processing requirements in space electric propulsion systems. This use also requires substantial areas of solar array to be at high positive potential relative to space and most of the spacecraft. The charge exchange plasma conducts electrons from the ion beam to such positive surfaces, and thereby electrically load the high voltage solar array. To evaluate this problem, the charge-exchange plasma generated by an ion beam was investigated experimentally. Based upon the experimental data, a simple model was derived for the charge-exchange plasma. This model is conservative in the sense that both the electron/ion density and the electron current density should be equal to, or less than, the predicted value for all directions in the hemisphere upstream of the ion beam direction. Increasing the distance between a positive potential surface (such as a high voltage solar array) and the thruster is the simplest way to control interactions. Both densities and currents vary as the inverse square of this distance. Author

N75-29176# National Aerospace Lab., Tokyo (Japan).

EXPERIMENTAL INVESTIGATION OF BEAMS EXHAUSTED FROM A 5cm MERCURY ELECTRONBOMBARDMENT ION ENGINE

Yoshihiro Nakamura, Hisao Azuma, and Katsuhiro Miyazaki 1975 19 p refs In JAPANESE; ENGLISH summary
(NAL-TR-398) Avail: NTIS HC $3.25

The relationship is discussed between engine operation parameters and the properties of the beams exhausted from a 5cm electronbombardment mercury ion engine. The process of the neutralization of the beam is considered. Space distributions of ion and electron current density of the beams were experimentally obtained using a Faraday cup and a flat plate probe. It is shown that the shapes of the ion current density distributions are intimately related to the perveance of the ion flow; this is deduced from the dimensional analysis of basic equations for ion flow. The space and floating potentials of the beam were measured using an emission probe and a flat plate. The space potential was determined mainly by the space charge limited condition of electron current between a neutralizer and the beam edge. Author

N75-29177# National Aerospace Lab., Tokyo (Japan).

A NUMERICAL SIMULATION FOR THE SPIRAL RAISING TO THE 24 HOUR ORBIT BY A LOW-THRUST SPACE VEHICLE WITH SOLAR ELECTRIC PROPULSION (SEP) SYSTEM

Shoichi Yoshimura, Heihachiro Kamimura, and Tatsuo Yamanaka Nov. 1974 21 p refs In JAPANESE; ENGLISH summary
(NAL-TR-395) Avail: NTIS HC $3.25

A computer simulation study was conducted for the orbital transfer of a space vehicle by using a low-thrust propulsion system. In the formulation of the basic equations of motion, two kinds of forces are regarded as the perturbation forces: one is the thrust generated by a low-thrust propulsion system, and the other is the disturbing force from the coefficient J sub 2 of zonal harmonics of the earth's gravitational potential. The disturbed orbit was derived by direct integration of a set of so-called osculating orbital elements. An orbital transfer was investigated, which is one from a low altitude elliptic parking orbit, with a 30 degrees inclination to the equator, to the synchronous equatorial orbit (24-hour orbit). In the simulation, two kinds of maneuvers were compared: one is the parallel maneuvers of orbit raising and plane change, and the other is the serial ones of these two operations. The effect of the earth's shadow on the transfer orbit is discussed, since the space vehicle must have a coasting flight during every eclipse in order to save the weight of batteries. Author

N75-29178# National Aerospace Lab., Tokyo (Japan).

THRUST VECTOR CONTROL BY SECONDARY INJECTION INTO ROCKET NOZZLES

Shinichi Ishii, Nobuo Chinzei, Kenji Kudo, and Akira Yamada Feb. 1975 13 p refs In JAPANESE; ENGLISH summary
(NAL-TR-409) Avail: NTIS HC $3.25

Secondary injection thrust vector control was experimentally investigated and an approximate analysis of estimating the control forces produced by liquid injection was developed. The control forces produced by the secondary injection were measured by a four component test stand. Fluids of various kinds were used as the injectants: hydrogen peroxide, decomposed gas of hydrogen peroxide, Freon 114B2, and strontium perchlorate. The effects of injection location and the injectant flow rate on the produced control forces were illustrated. An approximate analytical model to predict the disturbance induced by secondary liquid injection is presented. The estimated control forces based on the flow model are compared with the experimental results for cases of hydrogen peroxide and Freon 114B2. Author

N75-29179# Holosonics, Inc., Richland, Wash.

SOLID ROCKET MOTOR INSPECTION BY ACOUSTICAL HOLOGRAPHY TECHNIQUES Final Report

Dale Collins Jan. 1975 58 p refs
(Contract F04611-74-C-0019)
(AD-A006236; AFRPL-TR-74-83) Avail: NTIS CSCL 21/8

The feasibility of using acoustical holography as a nondestructive technique for determining small innerbore cracks and debonds in larger solid rocket motors was demonstrated. Cracks as small as one inch long, one-half inch deep, and less than 0.002 inch thick located on the innerbore of a simulated Minuteman third stage motor (18 inch web-thickness) were readily identified. Unbonds of one square inch area between the case and propellant were imaged. GRA

N75-29180# AeroChem Research Labs., Inc., Princeton, N.J.

A FULLY COUPLED UNDEREXPANDED AFTERBURNING ROCKET PLUME PROGRAM (THE AIPP CODE). PART 1: ANALYTICAL AND NUMERICAL TECHNIQUES Final Report, 1 Oct. 1972 - 30 Aug. 1974

H. S. Pergament and J. T. Kelly Nov. 1974 48 p refs
(Contract F04611-73-C-0017)
(AD-A006235; AeroChem-TP-302A; AFRPL-TR-74-59) Avail: NTIS CSCL 21/2

A comprehensive computer code has been developed to determine afterburning rocket plume characteristics over a wide altitude range. The code constitutes a significant advance over previous plume codes because it computes the plume shock structure while simultaneously accounting for turbulent mixing, nonequilibrium chemistry and gas/particle nonequilibrium effects. The capability of calculating properties in the subsonic region downstream of the Mach disc, downstream of the shock reflected from the triple point and in the far field has been incorporated into the code, but has not yet been debugged. This report describes the analytical and numerical techniques incorporated into the code, demonstrates that predictions of inviscid, chemically-frozen plume flows are as accurate as those obtained from a proven method of characteristics code and gives the results of some sample calculations for the SRAM missile. GRA

N75-29989 European Space Research Organization, Paris (France).

INFLUENCE OF COMBUSTION PHENOMENA ON THE POGO EFFECT

M. Barrere, J. Bouttes, and J. J. Dordain *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 1-47 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 1-21 Submitted for publication (For availability see N75-29988 20-99)

N75-29990 European Space Research Organization, Paris (France).
TRANSFER MATRICES OF HYDRAULIC SYSTEMS. THEORETICAL AND EXPERIMENTAL STUDY
Jean-Jacques Dordain and Michel Marchetti *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 48-84 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 23-35 Presented at the French Mech. Eng. Congr., Poitiers, 17-20 Sep. 1973 (For availability see N75-29988 20-99)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N75-29181*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
[A METHOD OF PREPARING AROMATIC POLYIMIDES HAVING UNIQUELY LOW SOFTENING TEMPERATURES] Patent Application
Vernon L. Bell, inventor (to NASA) Filed 28 Mar. 1975 10 p (NASA-Case-LAR-11828-1; US-Patent-Appl-SN-562992) Avail: NTIS HC $3.25 CSCL 07A

A method is described of preparing insoluble thermoplastic aromatic polyimides having uniquely low softening or glass transition temperatures by reacting, in a suitable solvent, an aromatic dianhydride, and a meta-substituted aromatic diamine. NASA

N75-29182# Research Inst. of National Defence, Stockholm (Sweden).
SYNTHESIS OF N-ACETYLNEURAMINIC ACID DERIVATIVES AND STUDIES OF THEIR INTERACTION WITH VIBRIO CHOLERAE NEURAMINIDASE
Leif Holmquist May 1975 22 p refs
(FOA-B-40018-B6; ISBN-91-7056-034-X) Avail: NTIS HC $3.25

In order to develop potent specific inhibitors of neuraminidase the interaction of the enzyme with chemically modified substrates was examined. Derivatives of N-acetylneuraminic acid were synthesized and their interaction with Vibrio cholera neuraminidase was studied to determine the structure of the active center in the enzyme. Complete inhibition of enzyme activity after treatment with ethyl diazoacetate supports the assumption that carboxyl groups in the active center of neuraminidase are essential for the catalytic activity. J.M.S.

N75-29183# Sandia Corp., Albuquerque, N.Mex.
SURFACE CLEANING IN THIN FILM TECHNOLOGY
D. M. Mattox Jan. 1975 32 p refs
(Contract AT(29-1)-789)
(SAND-74-0344) Avail: NTIS HC $3.75

A clean surface is one that contains no significant amounts of undesirable material. The types and origin of various contaminants are discussed. Since cleaning is often equated with adhesion, the mechanism of adhesion to oxide, metal, and organic surfaces is reviewed and cleaning processes for these surfaces are outlined. Techniques for monitoring surface cleaning are presented and the importance of storage of clean surfaces is detailed. Author (NSA)

N75-29184# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
APPLICATION OF DEUTERIZED COMPOUNDS FOR THE STUDY OF KINETICS AND MECHANISM OF THE THERMAL CONVERSIONS OF HYDROCARBONS
Yu. P. Yampolskii and Yu. V. Maximov 26 Nov. 1974 22 p refs Transl. into ENGLISH from the monograph "Gorenie i Vzryv" Moscow, 1972 p 650-653
(AD-A006007; FTD-MT-24-2004-74) Avail: NTIS CSCL 07/3

The method of labeled molecules using deuterized hydrocarbons, widely used for the study of catalytic processes, in a number of cases can be successfully applied for the explanation of the reaction mechanism of the thermal decomposition of hydrocarbons. This work gives results of a study of kinetics and mechanism of the thermal transformations of acetylene with the pyrolysis of ethylene and cracking of ethane with the aid of additions of deuterized joints. GRA

24 COMPOSITE MATERIALS

Includes laminates.

N75-29185+ Engineering Sciences Data Unit, London (England).
NORMAL INCIDENCE ABSORPTION COEFFICIENTS AND ACOUSTIC IMPEDANCES OF TYPICAL SINGLE LAYER FIBROUS LINING MATERIALS
Jun. 1973 13 p refs Sponsored in part by Ministry of Defense (Procurement Executive) and the Roy. Aeron. Soc.
(ESDU-74003) Copyright. Avail: NTIS HC $74.50

A method is presented for estimating the normal incidence absorption coefficients and acoustic impedances of fibermetals and polyimide laminates used to line aircraft gas turbine propulsion ducts. The materials considered are spaced from a solid backing sheet by a honeycomb layer; the amount of separation determines the frequency response of the liner. Absorption coefficients and acoustic impedances can be estimated for incident spectrum levels up to 160 db in the absence of air flow. The real and imaginary parts of the specific acoustic impedance ratio are derived in terms of the physical properties of the material and the noise environment in which it is placed. The data presented are confirmed by available test data for frequencies between 1 kHz and 6.5 kHz, air gaps between 6 mm and 50 mm, fibrous material thicknesses up to 1.5 mm, porosities up to 0.8, incident spectrum levels up to 160 db, and normal temperatures and pressures. Author

N75-29186*# Owens-Corning Fiberglas Corp., Toledo, Ohio.
RESEARCH, DEVELOPMENT AND APPLICATION OF NONCOMBUSTIBLE BETA FIBER STRUCTURES Final Report, 17 Apr. 1967 - 31 Dec. 1974
J. J. Dillon and E. S. Cobb Jul. 1975 24 p refs
(Contract NAS9-6988)
(NASA-CR-144365) Avail: NTIS HC $3.25 CSCL 11D

Beta fiber was selected as the primary material for flexible fibrous structures used in spacecraft and crew systems applications in the Apollo program because it was noncombustible in a 100 percent oxygen atmosphere up to 16.5 psia. It met NASA criteria for outgassing, toxicity, odor, and crew comfort, and possessed sufficient durability to last through the mission. Topics discussed include: study of spacecraft applications; design of Beta fiber textile structures to meet the requirements; selection of surface treatments (finishes, coatings, and printing systems) to impart the required durability and special functional use to the textile structures; development of sewing and fabrication techniques; and testing and evaluation programs, and development of production sources. Author

N75-29187*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF MAGNESIUM OXIDE CONTENT ON OXIDATION BEHAVIOR OF SOME SUPERALLOY-BASE CERMETS
Isidor Zaplatynsky Washington Aug. 1975 30 p refs
(NASA-TM-X-3265; E-8332) Avail: NTIS HC $3.75 CSCL 11D

The effect of increasing magnesium oxide (MgO) content on the cyclic oxidation resistance of hot-pressed cermets of MgO in NiCrAlY, MgO in Hoskins-875, MgO in Inconel-702, and MgO in Hastelloy-X was investigated. The cermets with magnesium oxide levels of 5, 10, 20, and 40 vol percent were examined. The cyclic oxidation behavior of these cermets at 1100 and 1200 C in still air was determined by a thermogravimetric method supplemented by X-ray diffraction analysis and light and electron microscopy. In all instances, MgO prevented grain growth in the metallic phase. No evidence of oxidation along interphase boundaries was detected. Cermets of MgO in NiCrAlY and MgO in Hoskins-875 were superior to cermets of MgO in Inconel-702 and MgO in Hastelloy-X. Their oxidation resistance was degraded only when the MgO content was 40 vol percent. The oxidation behavior of MgO-in-Inconel-702 powder cermets containing 5-

and 10-vol percent MgO was approximately similar to that of pure Inconel-702 compacts. The 20- and 40-vol percent MgO content reduced the oxidation resistance of MgO-in-Inconel-702 powder cermets relative to that of pure Inconel-702. Author

N75-29188*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RECENT NASA PROGRESS IN COMPOSITES
R. R. Heldenfels Aug. 1975 51 p refs Presented at USAF/NASA Symp. on Composites, an Assessment of the Future, Washington, D. C., 11-12 Jun. 1975
(NASA-TM-X-72713) Avail: NTIS HC $4.25 CSCL 11D

The application of composites in aerospace vehicle structures is reviewed. Research and technology program results and specific applications to space vehicles, aircraft engines, and aircraft and helicopter structures are discussed in detail. Particular emphasis is given to flight service evaluation programs that are or will be accumulating substantial experience with secondary and primary structural components on military and commercial aircraft to increase confidence in their use. Author

N75-29189# Radio Corp. of America, Cape Kennedy, Fla.
PROCEDURE FOR TESTING SYNTHETIC FIBER CABLES FOR FLEXING FATIGUE UNDER LOAD
E. L. Crosby, Jr. 13 Sep. 1973 9 p
(Contract F08606-74-C-0025)
(AD-A006042; RCA/TELTA-TR-73-033; AFETR-75-10) Avail: NTIS CSCL 11/5

The design, apparatus and procedure for testing the ability of synthetic cables to withstand rolling over a sheave (pulley-wheel) while under tension are described. The test is designed to be simulative of the use of tether-cables in flying large balloons. Because of the somewhat unusual nature of the test, the discussion section provides further detail on the significant of the test. GRA

N75-29190# Aerospace Research Labs., Wright-Patterson AFB, Ohio.
VALENCE BAND DENSITY OF STATES OF AMORPHOUS AND TRIGONAL SELENIUM DETERMINED BY X-RAY AND UV PHOTOEMISSION
N. J. Shevchik, J. Tejeda, M. Cardona, and D. W. Langer 22 Mar. 1973 6 p refs Submitted for publication
(AF Proj. 7885)
(AD-A006168; ARL-75-0071) Avail: NTIS CSCL 07/2

The densities of states of the entire valence bands of amorphous and trigonal selenium have been measured by X-ray (h nu = 1486.6eV) and u.v. (h nu = 21.2eV) photoemission. It is found that the primary differences in the density of states of the two forms occurs in the p-like valence bands, in particular the lower bonding set. The density of states calculated by Kramer et al for the amorphous form is shown to be in better agreement with the experimental density of states of the trigonal form than with that of the amorphous form. Author (GRA)

N75-29191# Transportation Research Board, Washington, D.C.
CHARACTERISTICS OF AND FACTORS INFLUENCING BITUMINOUS MATERIALS AND MIXTURE
R. A. Jimenez 1974 166 p
(PB-240957/1; TRB/TRR-515; ISBN-0-309-02359-9) Avail: NTIS HC $6.25 CSCL 13C

Contents: testing for debonding of asphalt from aggregates; a laboratory test system for prediction of asphalt concrete moisture damage; Effect of temperature, freeze-thaw, and various moisture conditions on the resilient modulus of asphalt-treated mixes; quantitative evaluation of stripping by the surface reaction test; changes in asphalt concrete mixture, properties as affected by absorption, hardening, and temperature; molecular interactions of asphalt in the asphalt-aggregate interface region; storage of asphalt concrete; Service behavior of asphalt concrete: a 10-year study; and laboratory evaluation of rheological behavior of an asphalt concrete containing an SBR elastomer. GRA

N75-29992 European Space Research Organization, Paris (France).
PROCESSING COMPOSITE MATERIALS WITH A METALLIC MATRIX
Rene Lignon *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 115-152 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 49-63 (For availability see N75-29988 20-99)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N75-29192* National Aeronautics and Space Administration, Washington, D.C.
VAPOR DEPOSITION APPARATUS Patent
William S. Nicol, inventor (to NASA) (MIT) Issued 7 Sep. 1971 5 p Filed 5 Nov. 1968 Sponsored by NASA
(NASA-Case-HQN-10462; US-Patent-3,603,285; US-Patent-Appl-SN-773530; US-Patent-Class-118-43) Avail: US Patent Office CSCL 07D

Vapor deposition apparatus is described which includes at least two crucibles adapted to contain evaporant materials of different volatilities and which are disposed to each form a vapor stream of uniform density and incident upon a common substrate. A chimney member having an exit disposed in the immediate vicinity of the substrate but outside of the vapor stream of the less volatile material is attached to the crucible containing the material of greater volatility.
Official Gazette of the U.S. Patent Office

N75-29193+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID ALIPHATIC HYDROCARBONS. 1: ALKANES
Mar. 1975 24 p refs Sponsored in part by Inst. of Chem. Engr. and Inst. of Mech. Engr.
(ESDU-75003) Copyright. Avail: NTIS HC $122.50

Values of thermal conductivity at saturation pressure are presented for liquid straight and branched chain alkanes. The range covered is from the melting point to approximately 0.9 of the critical temperature. The procedure used to obtain the values of thermal conductivity is described and the effect of pressure is indicated. Author

N75-29194+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID AROMATIC COMPOUNDS CONTAINING OXYGEN
Oct. 1974 23 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-74032) Copyright. Avail: NTIS HC $122.50

Values of thermal conductivity at saturation pressure are presented for liquid aromatic compounds containing oxygen which are members of the following groups: esters of aromatic acids, hydroxy compounds, ethers, aldehydes and ketones. The range covered is from either the melting point or the pour point to approximately 0.9 of the critical temperature. The procedure used to obtain the values of thermal conductivity is described and the effect of pressure is indicated. Empirical and structural formulae and parameters used in the modified Riedel equation are also given. Author

N75-29195+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID AROMATIC COMPOUNDS CONTAINING NITROGEN
Nov. 1974 18 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-74034) Copyright. Avail: NTIS HC $98.50

Thermal conductivity values at saturation pressure are presented for liquid aromatic compounds containing nitrogen which are members of the following groups: aromatic amines, N-alkyl aromatic amines, aromatic nitrile (cyanide), aromatic nitro compounds, and nitrogen heterocyclic compounds. The temperature range covered is from the melting point to approximately 0.9 of the critical temperature. The procedure used to obtain thermal conductivity values is described and the form of the equations used to represent the variation of thermal conductivity

with temperature is given. The effect of pressure on thermal conductivity is also considered. Empirical and structural formulae are presented along with the parameters used in the modified Riedel equation. Author

N75-29196+ Engineering Sciences Data Unit, London (England).
THERMODYNAMIC PROPERTIES OF TOLUENE
Jun. 1974 49 p refs
(ESDU-74024) Copyright. Avail: NTIS HC $218.50

Evaluated self-consistent thermodynamic properties of toluene are reported in tables and a temperature-entropy chart for use in thermophysical calculations for application in the production, purification and further processing of toluene and associated products, and in the design of process plants such as distillation columns, heat exchangers and reactors. Values are given for temperatures between 290 K and 680 K for pressures up to 50 MN/sqm, of specific volume, compression factor, specific entropy and enthalpy, specific heat capacities at constant pressure and constant volume together with these properties and vapor pressures for the saturated liquid and saturated vapor where applicable. Author

N75-29197+ Engineering Sciences Data Unit, London (England).
VAPOUR PRESSURES AND CRITICAL POINTS OF PURE SUBSTANCES. 4: C1 TO C20 ALCOHOLS
Sep. 1974 34 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-74023) Copyright. Avail: NTIS HC $170.50

Evaluated vapor pressure data for liquid alcohols are provided for use in thermophysical calculations in the design of process plants such as compressors, distillation columns, heat exchangers, liquefaction plants and reactors. The data are applicable from C-1 to C-20 alcohols, at pressures from 0.001 kN/sqm to the critical point. Author

N75-29198+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID HALOGENATED AROMATIC HYDROCARBONS
Jul. 1974 28 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-74014) Copyright. Avail: NTIS HC $146.50

Evaluated thermal conductivity data for liquid halogenated aromatic hydrocarbons are provided for heat transfer calculations in chemical process plant design. The halogenated derivatives of benzene, toluene and naphthalene are presented for temperatures from the melting point to 0.9 critical, and for pressures from below 1 atm to 500 atm. Author

N75-29199+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID AROMATIC HYDROCARBONS
May 1974 26 p refs Sponsored by Inst. of Chem. Engr.
Amendment A
(ESDU-74007) Copyright. Avail: NTIS HC $122.50

Evaluated thermal conductivity data for liquid aromatic halogenated hydrocarbons are provided for heat transfer calculations in chemical process plant design. The data are applicable from C-6 to C-18 compounds for temperatures from melting point to 0.9 critical, and for pressures from below 1 atm to 500 atm. Author

N75-29200+ Engineering Sciences Data Unit, London (England).
THERMODYNAMIC PROPERTIES OF BENZENE
May 1973 39 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-73009) Copyright. Avail: NTIS HC $122.50

Evaluated self-consistent thermodynamic properties of benzene are reported in tables and a temperature-entropy chart for use in thermophysical calculations for application in the production, purification, and further processing of benzene and associated products, and in the design of process plants such as distillation columns, heat exchangers and reactors. Saturated and superheated vapor values of the compression factor, specific volume, entropy, enthalpy, and heat capacities at constant pressure and constant volume are given for temperatures between 290 K and 650 K for pressures between 10 and 7000 kN/sqm. Also included are values of liquid density, specific enthalpy of vaporization, values of liquid density, specific enthalpy of vaporization, values of specific enthropy, and enthalpy for the two-phase saturation region. Author

N75-29201+ Engineering Sciences Data Unit, London (England).
VAPOUR PRESSURES OF PURE SUBSTANCES UP TO THEIR CRITICAL POINTS. 2: C2 TO C6 ALKENES (MONOOLEFINES)
Jul. 1973 42 p refs Sponsored by Inst. of Chem. Engr.
Amendment A
(ESDU-73008) Copyright. Avail: NTIS HC $170.50

Evaluated vapor pressure data for liquid hydrocarbons are provided for use in thermophysical calculations in the design of process plants such as compressors, distillation columns, heat exchangers, liquefaction plant, and reactors. The data are applicable from C-2 to C-6 alkenes for pressures from 0.1 kN/sqm to the critical point. Author

N75-29202+ Engineering Sciences Data Unit, London (England).
VAPOUR PRESSURES OF PURE SUBSTANCES UP TO THEIR CRITICAL POINTS. 3: C6 TO C10 ALKYLBENZENES
Oct. 1973 49 p refs Sponsored by Inst. of Chem. Engr.
Amendment A
(ESDU-73029) Copyright. Avail: NTIS HC $170.50

Evaluated vapor pressure data for liquid hydrocarbons are provided for use in thermophysical calculations in the design of process plants such as compressors, distillation columns, heat exchangers, liquefaction plant, and reactors. The data are applicable from C-6 to C-10 alkylbenzenes for pressures from 0.1 kN/sqm to the critical point. Author

N75-29203+ Engineering Sciences Data Unit, London (England).
NORMAL MELTING POINTS, BOILING POINTS AND CRITICAL POINTS OF n-ALKYL ESTERS OF MONOBASIC n-ALKANOIC ACIDS
Jan. 1971 17 p refs
(ESDU-71001) Copyright. Avail: NTIS HC $36.00

Evaluated reference temperatures of n-alkyl esters of normal monocarboxylic acids are provided for use in thermophysical calculations of vapor pressures. The data are applicable from C-1 to C-22 compounds. F.O.S.

N75-29204+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID n-ALKYL ALDEHYDES AND KETONES
Sep. 1971 34 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-71024) Copyright. Avail: NTIS HC $98.50

Evaluated thermal conductivity data for liquid n-alkyl aldehydes and ketones are provided for heat transfer calculations for use in chemical process plant design. The data are applicable from C-1 to C-20 compounds for temperatures from the melting point to 0.8 critical, and for pressures from below 1 atm to 500 atm. Author

N75-29205+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID BRANCHED CHAIN ESTERS OF MONOBASIC ALKANOIC ACIDS
Sep. 1971 20 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-71022) Copyright. Avail: NTIS HC $50.50

Evaluated thermal conductivity data for liquid branched chain esters are provided for heat transfer calculations in chemical process plant design. The data are applicable from C-4 to C-23 compounds for temperatures from melting point to 0.9 critical, and for pressures from below 1 atm to 500 atm. Author

N75-29206+ Engineering Sciences Data Unit, London (England).
NORMAL MELTING POINTS, BOILING POINTS AND CRITICAL POINTS OF n-ALKYL ALDEHYDES AND KETONES
Sep. 1971 13 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-71023) Copyright. Avail: NTIS HC $26.50

Tables giving the molecular weights and the empirical and structural formulas are presented. Experimental values of normal melting and normal boiling points are available for approximately half the compounds considered and a few determinations of the critical temperatures and critical pressures are given. Author

N75-29207+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID n-ALKYL ESTERS OF MONOBASIC n-ALKANOIC ACIDS
Jan. 1971 37 p refs Sponsored by Inst. of Chem. Engr.

(ESDU-71002) Copyright. Avail: NTIS HC $98.50

Evaluated thermal conductivity data for liquid alkyl esters of monocarboxylic acids are presented. The data are applicable from C-1 to C-22 compounds at temperatures from the melting point to the boiling point, and for pressures from 1 atm to 500 atm. F.O.S.

N75-29208+ Engineering Sciences Data Unit, London (England).
THERMAL CONDUCTIVITY OF LIQUID MONOBASIC ALKANOIC ACIDS
Jan. 1972 12 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-72007) Copyright. Avail: NTIS HC $26.50

Evaluated thermal conductivity data for liquid monobasic acids are provided for heat transfer calculations in chemical process plant design. The data are applicable from C-1 to C-22 compounds for temperatures from melting point to 0.9 critical, and for pressures from below 1 atm to 500 atm. Author

N75-29209+ Engineering Sciences Data Unit, London (England).
NORMAL MELTING POINTS, BOILING POINTS AND CRITICAL POINTS OF MONOBASIC ALKANOIC ACIDS
Jan. 1972 6 p refs Sponsored by Inst. of Chem. Engr.
(ESDU-72006) Copyright. Avail: NTIS HC $12.00

Evaluated reference temperatures of monobasic alkanoic acids are provided for use in thermophysical calculations of vapor pressures. The data are applicable from C-1 to C-22 compounds. Author

N75-29210+ Engineering Sciences Data Unit, London (England).
VAPOUR PRESSURES OF PURE SUBSTANCES UP TO THEIR CRITICAL POINTS. 1: C1 TO C8 ALKANES
Nov. 1972 35 p refs Sponsored by Institution of Chem. Engr.
(ESDU-72028) Copyright. Avail: NTIS HC $98.50

Evaluated vapor pressure data for liquid hydrocarbons are provided for use in thermophysical calculations in the design of process plants such as compressors, distillation columns, heat exchangers, liquifaction plant, and reactors. The data are applicable from C-1 to C-8 alkanes for pressure from 0.1kN/sqm to the critical point. Author

N75-29211*# Combustion, Heat and Mass Transfer Ltd., Wimbledon (England).
EFFECT OF GRAVITY ON METHANE-AIR COMBUSTION
Final Report
S. Elghobashi, H. I.03Smith Rosten, J. E., D. B. Spalding, and D. G. Tatchell 28 Jan. 1975 73 p refs
(Contract NASw-2671; CHAM Proj. 950)
(NASA-CR-143350; FR-950/1) Avail: NTIS HC $4.25 CSCL 21B

The elliptic axisymmetric integrator code was used as a starting point to develop a code for the effect of gravity on methane-air-combustion (EGOMAC). Both codes show rapid convergence and accuracy without the excessive computing times usually associated with elliptic codes. It is shown that the EGOMAC code will efficiently compute the hydrodynamic and thermodynamic fields associated with the laminar flame under transient gravity conditions. Features of the code include: inclusion of axial diffusion in the physical model which in certain cases is the mechanism which keeps the flame alight; provision of lateral pressure gradients in the model; the use of hybrid differencing scheme to enhance both accuracy and stability; and the use of implicity procedures for calculating all variables in the flow field. Author

N75-29212# National Aerospace Lab., Tokyo (Japan).
PROPAGATION OF THE FLAME WITHIN A NARROW TUBE
Kunio Nomizo, Hiroshi Tamura, and Sumio Okusowa 1974 13 p refs In JAPANESE; ENGLISH summary
(NAL-TR-394) Avail: NTIS HC $3.25

The characteristics of detonation and of normal flames within a narrow tube are studied. An experiment concerning flame quenching within a narrow tube, and analysis of the heat loss of the flame are performed. Author

N75-29213# Israel Program for Scientific Translations, Ltd., Jerusalem.
TRANSITION FROM DEFLAGRATION TO DETONATION IN CONDENSED PHASES
A. F. Belyaev, V. K. Bobolev, A. I. Korotkov, A. A. Sulimov, and S. V. Chuiko 1975 253 p refs Transl. into ENGLISH of the book "Perekhod Goreniya Kondensirovannykh Sistemov Vzryv" Moscow, Izdatelstvo Nauka, 1973 253 p Sponsored by US-Israel Binatl. Sci. Found.
(TT-74-50028; ISBN-0-7065-1496-3) Avail: NTIS HC $8.50 CSCL 21B

Methods of investigating rapid processes are described along with the instrumentation and equipment used in the research of transition from deflagration to detonation. Other topics discussed include: general properties of solid porous systems, stable deflagration of porous explosives, impairment of stable deflagration of gas-permeable porous systems, burning of systems with unconnected pores, growth of explosion, theory of limits of normal burning of liquid explosives, and experimental research on the hydrodynamic stability of burning of liquid explosives. M.J.S.

N75-29214*# Transemantics, Inc., Washington, D.C.
STUDY OF THE QUALITY OF AUTONOMOUS AND SEPARATE CONTROL OF MONOHYDRATE CONCENTRATION AND LEVEL IN SULFURIC ACID PLANTS
G. M. Fialko and D. I. Milman Washington NASA Aug. 1975 20 p refs Transl. into ENGLISH from Tr. Ural. Nauch.-Issled. Khim. Inst. (Sverdlovsk), v. 18, 1969 p 40-55
(Contract NASw-2792)
(NASA-TT-F-16491) Avail: NTIS HC $3.25 CSCL 07D

The stability regions of an automatic control system (ACS) regulating the concentration and level of monohydrate in autonomous and separate operation of the regulators were studied. A calculation of square deviations of the controlled variables in the presence of various disturbances is given together with an evaluation of the quality of independent and separate control. Author

N75-29215*# Scientific Translation Service, Santa Barbara, Calif.
THEORETICAL ASPECTS OF THE FUNDAMENTAL VELOCITY OF FLAMES IN THE TURBULENT REGIME
Gerard deSoete and A. VanTiggelen Washington NASA Aug. 1975 12 p refs Transl. into ENGLISH from Rev. Inst. Franc. Petrole Ann. Combust. Liquides (Paris), no. 19, 1964 p 1127-1130
(Contract NASw-2791)
(NASA-TT-F-16511) Avail: NTIS HC $3.25 CSCL 21B

Based on a fundamental equation which expresses the rate of flame propagation, it is shown that recycling under the influence of turbulence of a burned gas fraction in fresh gas modifies the fundamental velocity. This modification has the effect of an acceleration or retardation, depending on the value of certain parameters: activation energy, reaction order and flame temperature. The optimum recycling rate is calculated, and it depends on the same parameters. Author

N75-29216*# Rocketdyne, Canoga Park, Calif.
MATERIAL EVALUATION PROGRAM, HIGH-TEMPERATURE NITRIDING ENVIRONMENT
R. D. Marcy Oct. 1973 57 p
(Contract NAS9-13003)
(NASA-CR-144382; R-9196) Avail: NTIS HC $4.25 CSCL 07D

Results of a program conducted to evaluate materials for construction of a space shuttle hydrazine monopropellant gas generator are presented. The program was designed to select those materials that maintain the properties of strength and ductility after exposure to an 1800 F nitriding environment for 1000 hours. Author

N75-29217# Central Electricity Generating Board, Berkeley (England). Nuclear Labs.
ELECTROCHEMICAL MEASUREMENT OF CARBON POTENTIAL. PART 4: STUDIES ON SOME SODIUM-STEEL SYSTEMS AT 910K
M. R. Hobdell, J. R. Gwyther, and A. J. Hooper Sep. 1974 14 p refs
(RD/B/N-3157) Avail: ERDA Depository Libraries HC $4.00

An electrochemical carbon cell was used to monitor changes in carbon chemical potential (activity) accompanying carbon

transfer from 2 1/4Cr-1Mo ferritic steel to AISI 316 stainless steel in liquid sodium at 910 K. The variations of carbon activity with time in the separate 2 1/4Cr-1Mo steel/sodium and 316 steel/sodium systems were also investigated.
Author (NSA)

N75-29218# Iowa State Univ. of Science and Technology, Ames. Engineering Research Inst.
WATER AND VINYL TRICHLOROSILANE VAPOR INTERACTIONS WITH E-GLASS FIBERS Final Report, 26 Jun. 1973 - 1 Oct. 1974
David M. Martin 1 Oct. 1974 29 p refs
(Contract DAAG46-73-C-0250; DA Proj. 1T0-62105-A-329)
(AD-A005088; ISU-ERI-AMES-74276) Avail: NTIS CSCL 07/4

In order to provide insight into the weathering of glass reinforced plastics, gravimetric adsorption isotherm techniques were used to study the adsorption of water vapor on E-glass fibers drawn in dry atmospheres and E-glass fibers drawn in a vinyl trichlorosilane atmosphere. The adsorption of vinyl trichlorosilane vapor on E-glass fibers was found to be diffusion controlled Langmuir chemisorption in character. Water vapor was shown to have a lower affinity for E-glass surfaces drawn in dry air than for E-glass fibers drawn in a dry air/vinyl trichlorosilane, atmosphere. The details of the adsorption and readsorption process are discussed. GRA

N75-29219# Bureau of Mines, Pittsburgh, Pa. Mining and Safety Research Center.
CHEMICAL FLAME INHIBITION USING MOLECULAR BEAM MASS SPECTROMETRY. COMPUTATIONAL METHODS FOR ANALYZING FLAME MICROSTRUCTURE Report of Investigation
John F. Papp, Charles P. Lazzara, and Joan C. Biordi Mar. 1975 95 p refs
(PB-241245/0; BM-RI-8019) Avail: NTIS HC $4.75 CSCL 07D

The microstructure of low-pressure flat flames was sampled by mass spectrometer for normal methane-oxygen-argon and for methane-oxygen-argon-bromotrifluoromethane flames. The physical and chemical phenomena, and the method of analysis of mole fraction data to evaluate net reaction rates are considered in detail. Included is a computer program listing with output on one flame. Chemical species considered are CH4, CO, CO2, H, H2O, OH, Ar, H2, O2, O, H2CO, CH3, CF2Br, Br, CH3Br, HCO, F2CO, CH2CF2, HO2. GRA

N75-29220# Army Foreign Science and Technology Center, Charlottesville, Va.
FORMAL KINETICS OF REACTIONS OCCURRING IN PHOTODISSOCIATION GAS LASERS
G. A. Skorobogatov 30 Dec. 1974 18 p refs Transl. into ENGLISH from Vestn. Leningr. Univ., Ser. Fiz. i Khim. (Leningrad), v. 25, no. 4, 1970 p 144-156
(AD-A005954; FSTC-HT-23-1146-73) Avail: NTIS CSCL 07/5

Formal kinetics of reactions in gaseous lasers, based on electronic transition A(1) yields A(0) - h(nu) with photodissociation source of the A(1) atoms have been considered for various possible mechanisms of quenching a stimulated emission. The action of a gaseous laser beam based on the transition I(doublet P(1/2)) yields I(doublet P(3/2)) has been considered as an example.
GRA

N75-29221# Air Force Materials Lab., Wright-Patterson AFB, Ohio.
COMPUTER ANALYSIS OF THE MASS SPECTRA OF GAS MIXTURES Technical Report, Jan. 1972 - Jun. 1973
R. H. Pritchard and I. J. Goldfarb Jan. 1975 36 p refs
(AF Proj. 7342)
(AD-A006160; AFML-TR-73-280) Avail: NTIS CSCL 07/4

The report describes the development of a complex computer program package which can be used to solve the extremely difficult problem of analyzing gas mixtures, such as polymer pyrolysis products, from their mass spectra. This program package can, using only digitized mass spectral data as input, find the peaks in each mass scan and perform a complete quantitative analysis of the gas mixture that gave rise to the spectrum. This analysis can now be accomplished quickly and accurately for the first time. It provides the basis for determining critically needed kinetics and mechanisms of polymer degradation. In addition, the program package has general applicability for compositional analysis of gaseous systems and for spectral peak finding. GRA

N75-29222# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMBUSTION OF RICH KEROSENE-AIR MIXTURES IN TUNNEL TYPE CHAMBER
V. I. Blinov and A. I. Lushpa 5 Dec. 1974 19 p refs Transl. into ENGLISH from the monograph "Gorenie i Vzryv" Moscow, 1972 p 416-420
(AD-A005995; FTD-MT-24-1934-74) Avail: NTIS CSCL 21/2

Experimental research on the combustion process of kerosene-air mixtures is presented in the model of the tunnel combustion chamber under a pressure of 1.1 atm(abs.) and with a change in the excess air ratio from 1.0 to 0.3. The effect of air temperature (0-1000C), of the length of the combustion chamber (0.5-2.0 m) and the values of the air ratio on the degree of approximation of composition and thermodynamic parameters of combustion products to their values at chemical equilibrium was investigated. GRA

N75-29223# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
KINETICS AND MECHANISM OF THE THERMAL DECOMPOSITION OF SALTS OF HYDRAZONIUM
Yu. I. Rubtsov 5 Dec. 1974 18 p refs Transl. into ENGLISH from Gorenie i Vzryv. (Moscow), 1972 p 771-774
(AD-A005994; FTD-MT-24-2029-74) Avail: NTIS CSCL 07/2

The results of the study of the thermal decomposition of hydrazonium nitrate were reported. It was shown that the reaction occurs by the dissociation of salt in liquid phase for hydrazine and nitric acid, but reaction rate is determined by the rate decomposition of hydrazine. GRA

N75-29224# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON CONSTRUCTION OF THE CLOSED THEORY OF SPINNING DETONATION
S. K. Aslanov and P. I. Kopeika 5 Dec. 1974 21 p refs Transl. into ENGLISH from the monograph "Gorenie i Vzryv" Moscow, 1972 p 487-490
(AD-A005993/1; FTD-MT-24-1951-74) Avail: NTIS HC $3.25

A two-dimensional nuclear model of spinning detonation was constructed and is described. Other topics discussed include detonation propagation, detonation waves, combustion of gaseous mixtures, and thermodynamics. M.J.S.

N75-29225# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SPHERICALLY SYMMETRIC OPTICAL DISCHARGE AS ANALOG OF DIFFUSION COMBUSTION IN THE MIXTURE OF FUEL GASES
I. K. Selezneva 26 Nov. 1974 23 p refs Transl. into ENGLISH from the monograph "Gorenie i Vzryv." Moscow, 1972 p 396-400
(AD-A005991; FTD-MT-24-1931-74) Avail: NTIS CSCL 21/2

This work is dedicated to the investigation of diffusion combustion on the surface of a spherical gas body and the combustion of the spherically symmetric gas discharge, supported with the source of the coherent radiation whose power is lower than threshold for a breakdown. Both these phenomena were observed in experiments. Steady state characteristics and stability are discussed. GRA

N75-29226# Princeton Univ., N.J. Dept. of Chemical Engineering.
THE GAS DENSITY BALANCE AND THE MASS CHROMATOGRAPH Technical Report, Dec. 1973 - Jan. 1975
Erdogan Kiran Feb. 1975 61 p refs Prepared in cooperation with Textile Res. Inst.
(Contract N00014-67-A-0151-0024; NR Proj. 356-504)
(AD-A006481; TR-24) Avail: NTIS CSCL 07/4

A theoretical development is presented to show the

hydrodynamics of operation of the gas density balance (a gas chromatographic detector that is currently being used in the mass chromatograph). Theoretical aspects of the mass chromatograph and a formal derivation of its operational relationships are also presented and discussed. GRA

N75-29227# Fluorochem, Inc., Azusa, Calif.
HIGH ENERGY HALOGEN CHEMISTRY Annual Report, 1 Dec. 1973 - 1 Dec. 1974
Kurt Baum, Charles D. Beard, Vytatas Grakauskas, and Duane A. Lerdal Jan. 1975 26 p refs
(Contract N00014-71-C-0176; NR Proj. 093-052)
(AD-A006468) Avail: NTIS CSCL 07/3

The objective of this research program is to explore the synthesis of new functional groupings with potential utility in high energy propellants and explosives. The major emphasis of this research has been on the preparation of organic derivatives of oxidized halogen compounds. Included in this report are discussions and results concerning perbromate, chlorine dioxide, dichlorine heptoxide, and fluorodinitro-ethanol chemistry. GRA

N75-29228# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PROCESS OF IGNITION AND COMBUSTION OF HYDROGEN IN A SUPERSONIC FLOW
V. N. Strokin 26 Nov. 1974 17 p refs Transl. into ENGLISH from the monograph "Gorenie i Vzryv" Moscow, 1972 p 282-285
(AD-A006012; FTD-MT-24-1907-74) Avail: NTIS CSCL 21/2

The report examines results of an experimental study of the combustion of hydrogen in a cylindrical wind tunnel with entrance Mach number of 3.5, connected to gas preheater (T - 2100 K). The complexity of the pattern of flow, which is realized with the injection of streams of hydrogen from wall, does not make it possible for the full theoretical analysis of the problem of spontaneous ignition and combustion. In connection with this were carried out the calculations of ignition for free and near-wall boundary layers. GRA

N75-29229# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANALYSIS OF THE STRUCTURE OF THE DIFFUSION FLAMES OF HYDROGEN
R. S. Tyulpanov, V. F. Sokolenko, and A. I. Alimpiev 26 Nov. 1974 19 p refs Transl. into ENGLISH from the monograph "Gorenie i Vzryv" Moscow, 1972 p 318-321
(AD-A006008; FTD-MT-24-1916-74) Avail: NTIS CSCL 21/2

The Toepler method is used to investigate the structure of turbulent diffusion flames of hydrogen. The mean statistical scales are determined for fluctuations of density in turbulent flow and the fluctuations of temperature caused by fluctuations of concentration and pressure are considered. The Toepler pattern of diffusion flames of hydrogen is compared with cold mixing. It it shown that the refractivity gradients caused by temperature gradients are larger than those caused by changes in hydrogen concentration. J.M.S.

N75-29230# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
STABILIZATION OF THE FLAME OF HETEROGENEOUS MIXTURES
B. P. Lebedev and I. S. Doctor 26 Nov. 1974 20 p Transl. into ENGLISH from the monograph "Gorenie i Vzryv" Moscow, 1972 p 361-364
(AD-A006010; FTD-MT-24-1924-74) Avail: NTIS CSCL 21/7

The experimental study was performed to examine features of the stabilization of the flame of a heterogeneous mixture (rich in fuel in vapor phase) in comparison with a uniform mixture. GRA

N75-29231# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RATE CONSTANTS OF SOME ELEMENTARY STAGES OF THE REACTION OF FLUORINE WITH HYDROGEN
G. A. Kapralova, E. M. Margolina, and A. M. Caikan 5 Dec. 1974 19 p Transl. into ENGLISH from the book "Gorenie i Vzryv" Moscow, Izd. vo Nauka, 1972 p 634-637
(AD-A006011; FTD-MT-24-2000-74) Avail: NTIS CSCL 07/4

The reaction rate constants of branching (K3), during vibrational-translational deactivation of H2 (K4) and the transmission of oscillatory quantum from HF resonance molecule to H2 (K7) molecule was measured. For determining K3 and K4 at room temperature, thermograms of the fluorine reaction with hydrogen were used. The second limit was achieved by gradual decrease in the pressure mixture. The temperature of the reacting mixture was measured by resistance thermometer. Author

N75-29232# Air Force Materials Lab., Wright-Patterson AFB, Ohio.
THE DEVELOPMENT OF AN AUTOMATIC MULTISAMPLE ISOTHERMAL AGING APPARATUS Technical Report, Dec. 1971 - Dec. 1973
K. R. Fisch Dec. 1974 21 p ref
(AF Proj. 7340)
(AD-A006156; AFML-TR-74-163) Avail: NTIS CSCL 14/2

A prototype isothermal aging apparatus has been developed in which up to ten polymer samples can be exposed to temperatures up to 1000F for long periods of time. Weight losses of the samples are automatically determined at preset intervals and the information is stored on paper tape. The reproducibility of the data is excellent. The apparatus is being adapted for computerization of the data. GRA

N75-29233# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
THE CHARACTERISTICS OF SELF SUSTAINED PARTICULATE BORON COMBUSTION IN AIR AT AMBIENT PRESSURE Ph.D. Thesis
Lowell Wesner Ormand Sep. 1974 164 p refs
(AD-A006039; DS/ME/74-2) Avail: NTIS CSCL 01/2

A one dimensional analytical model for the steady state combustion of a multiparticle cloud of boron in air was established. This model stressed the importance of radiant heat transfer from the luminous flame and heat of combustion from burning particles adhering to the combustor walls to heat the suspended particles to ignition temperature. A steady state, self-sustained flame of elemental boron in air was investigated to verify the model. Trona amorphous boron powder, with nominal particle size of one micrometer, was used as the fuel. Experimental combustion characteristics calculated from the analysis yielded an Arrhenius activation energy near 40 Kcal/mole. GRA

N75-29234# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
STUDY OF WATER ABSORPTION LINES IN THE NEAR INFRARED Semiannual Report, 1 Nov. 1973 - 31 Oct. 1974
Ali Javan 17 Feb. 1975 75 p refs
(Contract N00014-75-C-0360; ARPA Order 1807)
(AD-A005636; SAR-2/3) Avail: NTIS CSCL 07/4

Progress has been made in the following area: (1) development of a tunable 5 micrometer spin-flip Raman laser and application to precision spectroscopy of H2O; (2) studies of wings of water vapor lines; (3) other spectroscopic applications of the spin-flip Raman laser; (4) development of a tunable 5 micrometer pulsed laser; (5) spectroscopy of D2O using an acoustical modulator for frequency tuning; (6) velocity dependence of collision processes in NH3; (7) theoretical formulation of absorption far from line center collision induced absorption in rare gas mixture. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N75-29235 British Library Lending Div., Boston Spa (England).
THE CHEMICAL DEPOSITION OF DISPERSION COATINGS WITH Ni-P AND Ni-B MATRICES. EMBEDDING OF OXIDES: TITANIUM DIOXIDE
G. Gawrilov and E. Ovtscharova 14 May 1974 14 p refs Transl. into ENGLISH from Galvanotechnik (West Germany), v. 64, 1973 p 23-28

(BLL-LTI-746-01460-(9022.401)) Avail: British Library Lending Div., Boston Spa, Engl.: 2 BLL photocopy coupons

The physical and chemical properties of dispersion coatings, particularly with Ni-B-TiO2 alloy, were investigated. Special attention was also given to the possibility of imbedding TiO2 in a Ni-B matrix. Results show that: (1) production of dispersion coatings is possible by means of chemical (electroless) nickel plating, (2) rate of codeposition in the production of the composite material Ni-P-TiO2 depends on the concentration of the dispersoid in the solution and the temperature, (3) concentration by weight of TiO2 in the coating produced depends on the dispersoid concentration in the solution, the temperature, and the extent of dispersion, (4) microhardness of the Ni-P-TiO2 alloy increases with the concentration by weight of the TiO2 and after heat-treatment, (5) Ni-P-TiO2 composite has better wear resistance in dry friction as compared with the corresponding nickel-phosphorus alloy, (6) composite has one quarter of the rate of high temperature oxidation of the corresponding nickel-phosphorus alloy, and (7) best corrosion resistance was shown by dispersion coatings produced from suspensions with a TiO2 content of 5 and 15 wt.%. Author

N75-29236* National Aeronautics and Space Administration. Pasadena Office, Calif.

METHOD OF HEAT TREATING AGE-HARDENABLE ALLOYS **Patent**

Chester S. Shira, inventor (to NASA) (Rocketdyne, Canoga Park, Calif.) Issued 25 Jun. 1968 5 p Filed 4 Feb. 1965 Sponsored by NASA

(NASA-Case-XNP-01311; US-Patent-3,390,023; US-Patent-Appl-SN-430496; US-Patent-Class-148-127) Avail: US Patent Office CSCL 11F

A method of heat treating age-hardenable nickel-chromium base alloys is presented. The temperature and rate of cooling of the alloys is controlled after being solution heated to produce annealed alloy bodies with a yield strength of 90,000 psi.

Official Gazette of the U.S. Patent Office

N75-29237*# Scientific Translation Service, Santa Barbara, Calif.

EFFECT OF OXYGEN IMPURITY ON THE PRESSURE-SINTERING OF ALUMINUM NITRIDE

T. Sakai and M. Iwata Washington NASA Jul. 1975 21 p refs Transl. into ENGLISH from Taikabutsu (Japan), v. 26, no. 193, 1974 p 54-60

(Contract NASw-2483)

(NASA-TT-F-16452) Avail: NTIS HC $3.25 CSCL 11F

Experiments were conducted on pressure-sintering of AlN powder samples synthesized from alumina; the AlN powders contained different amounts of oxygen impurities. It was found that a rate equation of densification for a pressure-sintering was satisfied with part of the experiments, and was not with others. The reason for absence of agreement between the sintering behaviors of the experiments, and the equation was a result of the decreasing oxygen impurity during the holding time at temperatures above 1900 C. The oxygen impurity accelerates the densification rate and improves the mechanical strength of sintered AlN. The sintered specimens with more than 2.5 wt. % of oxygen had compressive strength above 150 kg/sq mm. The AlN powders are useful as refractory materials owing to their high mechanical strength and chemical resistivity. Author

N75-29238*# Boeing Aerospace Co., Seattle, Wash.

THRUST CHAMBER LIFE PREDICTION. VOLUME 1: MECHANICAL AND PHYSICAL PROPERTIES OF HIGH PERFORMANCE ROCKET NOZZLE MATERIALS **Final Report**

John J. Esposito and Ronald F. Zabora Mar. 1975 44 p refs (Contract NAS3-17838)

(NASA-CR-134806; D180-18673-1-Vol-1) Avail: NTIS HC $3.75 CSCL 11F

Pertinent mechanical and physical properties of six high conductivity metals were determined. The metals included Amzirc, NARloy Z, oxygen free pure copper, electroformed copper, fine silver, and electroformed nickel. Selection of these materials was based on their possible use in high performance reusable rocket nozzles. The typical room temperature properties determined for each material included tensile ultimate strength, tensile yield strength, elongation, reduction of area, modulus of elasticity, Poisson's ratio, density, specific heat, thermal conductivity, and coefficient of thermal expansion. Typical static tensile stress-strain curves, cyclic stress-strain curves, and low-cycle fatigue life curves are shown. Properties versus temperature are presented in graphical form for temperatures from 27.6K (-410 F) to 810.9K (1000 F). Author

N75-29239*# Scientific Translation Service, Santa Barbara, Calif.

REACTION BETWEEN REFRACTORY METALS AND INSULATING NITRIDES AT HIGH TEMPERATURES

Toshiyuki Sata and Teruo Urano Washington NASA Jul. 1975 22 p refs Transl. into ENGLISH from J. Ceram. Soc. Japan (Japan), v. 78, no. 1, 1970 p 21-29

(Contract NASw-2791)

(NASA-TT-F-16477) Avail: NTIS HC $3.25 CSCL 11F

The reactions between electric insulators (BN, AlN, and Si3N4) and conductors of refractory metals (tungsten and tantalum) were investigated at temperatures up to 2100 C in a tungsten furnace under argon atmosphere. Results are presented and discussed. Author

N75-29240*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HOT CORROSION EVALUATION OF ALUMINIDE COATED SUPERALLOYS IN SUPPORT OF AN ASTM ROUND ROBIN PROGRAM

Gilbert Santoro Jul. 1975 36 p refs

(NASA-TM-X-71734) Avail: NTIS HC $3.75 CSCL 11F

Commercial aluminized coatings on substrates were hot corroded at 900 C in a 0.3 Mach burner rig with 5 ppm synthetic sea salt and at two cycling frequencies. Extensive post-exposure examinations were conducted on the corroded specimens such as metallography, X-ray diffraction, scanning electron microscopy, microprobe raster scans, and spectrographic analyses. Thermodynamic calculations were made of the equilibrium burner flame composition and the calculations were compared to the experimental findings. It was found that localized spalling of the coatings preceded coating failure. It is suggested that the spalling of the coatings is due to the formation of localized stresses caused by the depletion of chromium and aluminum in the coating or the enrichment of the coating with sulfur. For the materials and test conditions investigated, it was found that coating life is dependent only upon the initial coating thickness and not on the type of aluminized coating, the substrate, or the cycle frequency. Author

N75-29241*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THE FEASIBILITY OF RANKING MATERIAL FRACTURE TOUGHNESS BY ULTRASONIC ATTENUATION MEASUREMENTS

Alex Vary 1975 19 p refs Proposed for Presentation at Ultrasonic Symp., Los Angeles, 22-24 Sep. 1975; sponsored by IEEE

(NASA-TM-X-71769; E-8396) Avail: NTIS HC $3.25 CSCL 11F

A preliminary study was conducted to assess the feasibility of ultrasonically ranking material fracture toughness. Specimens of two grades of maraging steel for which fracture toughness values were measured were subjected to ultrasonic probing. The slope of the attenuation coefficient versus frequency curve was empirically correlated with the plane strain fracture toughness value for each grade of steel. Author

N75-29242*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

STRUCTURE AND THERMAL CYCLING STABILITY OF A HAFNIUM MONOCARBIDE REINFORCED DIRECTIONALLY SOLIDIFIED COBALT-BASE EUTECTIC ALLOY

Y. G. Kim 1975 11 p refs Presented at Conf. on In-Situ Composites, 2, Bolton Landing, Lake George, N. Y., 2-5 Sep. 1975; sponsored by Am. Inst. of Mining, Met., and Petroleum Engr., NASA, AROD, and ONR

(NASA-TM-X-71751; E-8391) Avail: NTIS HC $3.25 CSCL 11F

A nominal composition of Co-15Cr-20Ni-10.5 Hf-0.7 C (NASA-HAFCO-11) was directionally solidified at 0.8 cm/hr growth rate to produce aligned HfC in a cobalt matrix alloy.

The aligned HfC fibers were present as rod and plate types. The diameter of the aligned fibers was about 1 micron, with volume fraction in the range of 11 to 15 percent. The growth direction of the fibers was parallel to the <100>. The NASA-HAFCO-11 alloy was subjected to thermal cycling between 425 deg and 1100 C, using a 2.5 minute cycle. No microstructural degradation of the HfC fibers in the alloy was observed after 2500 cycles. Author

N75-29243*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DIRECTIONALLY SOLIDIFIED PSEUDO-BINARY EUTECTICS OF Ni-Cr-(Hf, Zr)
Y. G. Kim and R. L. Ashbrook 1975 10 p refs Presented at Conf. on In-Situ Composites, Z, Bolton Landing, Lake George, N. Y., 2-5 Sep. 1975; sponsored by Am. Inst. of Mining, Met., and Petroleum Engr., NASA, AROD, and ONR
(NASA-TM-X-71765; E-8417) Avail: NTIS HC $3.25 CSCL 11F

A pseudo-binary eutectic, in which the intermetallic Ni7Hf2 reinforces the Ni-Cr solid solution phase, was previously predicted in the Ni-Cr-Hf system by a computer analysis. The experimental determination of pseudo binary eutectic compositions and the directional solidification of the Ni-Cr-Hf, Zr, and Ni-Cr-Zr eutectic alloys are discussed. To determine unknown eutectics, chemical analyses were made of material bled from near eutectic ingots during incipient melting. Nominal compositions in weight percent of Ni-18.6Cr-24.0HF, Ni19.6Cr-12.8Zr-2.8Hf, and Ni-19.2Cr-14.8Zr formed aligned pseudo-binary eutectic structures. The melting points were about 1270 C. The reinforcing intermetallic phases were identified as noncubic (Ni,Cr)7Hf2 and (Ni,Cr)7(Hf,Zr)2, and face centered cubic (Ni,Cr)5Zr. The volume fraction of the reinforcing phases were about 0.5. Author

N75-29244# Aeronautical Research Labs., Melbourne (Australia).
THE EFFECTS OF NOTCHES OF HIGH Kt ON THE FATIGUE BEHAVIOUR OF 7178-T6 ALUMINIUM ALLOY
J. Y. Mann Nov. 1974 29 p refs
(ARL/SM-354) Avail: NTIS HC $3.75

Rotating cantilever fatigue tests were carried out at 12,000 cpm (200 Hz) on specimens made from 7178-T6 aluminium alloy extruded bar to study the fatigue strength reductions caused by V-notches of small tip radii. The maximum reduction in fatigue strength is associated with a notch which corresponds to a tip radius of approximately 0.001 inch (0.025 mm) for the geometry of the specimens employed. Further decreasing the tip radius resulted in an increase in fatigue strength. The relevance of using fatigue test data generated at high cyclic frequency for practical situations involving much lower frequencies of cyclic loading is discussed. It is further suggested that the general relationship between the standard deviation of log life and average endurance may be exponential in form. Author

N75-29245*# Kanner (Leo) Associates, Redwood City, Calif.
HOT CORROSION IN BURNER GAS AT 1200 C
J. Schlichting Washington NASA Aug. 1975 17 p refs Transl. into ENGLISH from Z. Werkstofftechnik (West Germany), v. 6, Jan. 1975 p 11-16
(Contract NASw-2790)
(NASA-TT-F-16509) Avail: NTIS HC $3.25 CSCL 11F

The influence of various corrosive agents on the oxidation behavior of MoSi2-coated alloys was investigated. The MoSi2 coat was highly resistant to acid agents but susceptible to basic ones. Its solubility in the latter was due to transport of molecular oxygen through the glasses formed by surface oxidation. Sintered MoSi2-coated refractory metals are nevertheless much more durable than NiAl-coated superalloys under hot corrosion. Author

N75-29246*# Agnew Tech-Tran, Woodland Hills, Calif.
STUDY OF ZIRCONIUM-NIOBIUM-NICKEL SYSTEM BY LOCAL X-RAY ANALYSIS
A. D. Yevdokimova, S. M. Kuznetsova, G. N. Ronami, and Ye. M. Sokolovskaya Washington NASA Jul. 1975 8 p refs Transl. into ENGLISH fom Vestn. Mosk. Univ., Ser. 2: Khim. (Moscow), v. 11, no. 1, 1970 p 62-66
(Contract NASw-2789)
(NASA-TT-F-16474) Avail: NTIS HC $3.25 CSCL 11F

An X-ray microanalyzer was used to investigate a considerable number of samples of the Zr-Nb-Ni system, which had undergone heat treatments of 700 hours at 800 C and 2000 hrs at 500 C. The results are presented in both diagrammatic and tabular form. In general, the X-ray results obtained tend to confirm the results of earlier work with regard to the presence of the various phases and phase equilibria, but the state Zr7Ni10 was found to play a more significant role than heretofore believed. Author

N75-29247*# Battelle Columbus Labs., Ohio.
DETERMINATION OF STRUCTURAL ENGINEERING PROPERTIES OF INCOLOY 903 AND CTX-1 ALLOYS Final Report
Paul E. Ruff 31 Jul. 1975 158 p refs
(Contract NAS8-30929)
(NASA-CR-120673) Avail: NTIS HC $6.25 CSCL 11F

Tension, notched tension, compression, density, thermal conductivity, and thermal expansion tests were conducted on Incoloy 903 over the temperature range 20 K (-423 F) through 1033 K (1400 F). Fracture toughness tests were performed at room temperature (RT). Creep and rupture tests were conducted at 811 K (1000 F), 922 K (1200 F), and 1033 K (1400 F) for this alloy. Transverse unnotched and notched fatigue tests at R = 0.1 were performed at RT and 922 K (1200 F). For CTX-1 alloy, tension, Charpy V-notch impact, density, thermal conductivity, and thermal expansion tests were conducted over the temperature range 20 K (-423 F) through 1033 K (1400 F). Poisson's ratio was determined at RT, 811 K (1000 F), 922 K (1200 F), and 1033 K (1400 F). Notched tension and compression tests were performed at 20 K (-423 F), RT, and 922 K (1200 F); plane strain fracture toughness tests were conducted at RT, 77 K (-320 F), and 20 K (-423 F). Creep and rupture tests were performed at 811 K (1000 F), 922 K (1200 F), and 1033 K (1400 F); longitudinal unnotched and notched fatigue tests at R = 0.1 were conducted at RT and 922 K (1200 F). Results are presented and discussed. Author

N75-29248*# Pratt and Whitney Aircraft, West Palm Beach, Fla. Research and Development Center.
DEVELOPMENT OF SPUTTERED TECHNIQUES FOR THRUST CHAMBERS Interim Report
J. R. Mullaly, R. J. Hecht, T. E. Schmid, and C. T. Torrey Mar. 1975 161 p refs
(Contract NAS3-17792)
(NASA-CR-134824; FR-6924) Avail: NTIS HC $6.25 CSCL 11F

Techniques and materials were developed and evaluated for the fabrication and coating of advanced, long life, regeneratively cooled thrust chambers. Materials were analyzed as fillers for sputter application of OFHC copper as a closeout layer to channeled inner structures; of the materials evaluated, aluminum was found to provide the highest bond strength and to be the most desirable for chamber fabrication. The structures and properties were investigated of thick sputtered OFHC copper, 0.15 Zr-Cu, Al2O3,-Cu, and SiC-Cu. Layered structures of OFHC copper and 0.15 Zr-Cu were investigated as means of improving chamber inner wall fatigue life. The evaluation of sputtered Ti-5Al-2.5Sn, NASA IIb-11, aluminum and Al2O3-Al alloys as high strength chamber outer jackets was performed. Techniques for refurbishing degraded thrust chambers with OFHC copper and coating thrust chambers with protective ZrO2 and graded ZrO2-copper thermal barrier coatings were developed. Author

N75-29249*# State Univ. of New York, Stony Brook. Dept. of Materials Science.
THERMODYNAMICS AND KINETICS OF REACTIONS IN PROTECTIVE COATING SYSTEMS Semiannual Report, 1 Dec. 1974 - 31 May 1975
B. Gupta, A. Sarkhel, S. Shankar, and L. Seigle 31 May 1975 31 p refs
(Grant NGR-33-015-160)
(NASA-CR-143313; SAR-5) Avail: NTIS HC $3.75 CSCL 11F

A study of the aluminization of Ni from packs containing various percentages of unalloyed Al confirmed that the surface aluminum content of specimens aluminized tends to decrease with time and consequently a simple parabolic law for the weight-gain vs. time relationship is not obeyed. The diffusivity-

composition relationship in NiAl was examined, and a set of curves is presented. A numerical method for the calculation of coating dissolution rates was developed and applied to NiAl-Ni3Al type of coatings. Author

N75-29250*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FRETTING OF TITANIUM AT TEMPERATURES TO 650 C IN AIR
Robert C. Bill Washington Aug. 1975 23 p refs Prepared in cooperation with Army Air Mobility R and D Lab., Cleveland (NASA-TN-D-8048; E-8286) Avail: NTIS HC $3.25 CSCL 11F

Fretting wear experiments were conducted on high-purity titanium at temperatures up to 650 C. Results indicate that up to about 500 C, the fretting wear increases with temperature. A further increase in the temperature up to 650 C results in decreasing fretting wear. This change in trend of fretting wear with temperature is shown to be associated with a change in oxidation rate. Additional experiments at 650 C showed a transmission from a low rate of fretting wear to a higher rate occurred after exposure to a number of fretting cycles; the number of cycles required to cause this transition was dependent on the normal load. Scanning electron microscopy studies revealed that this transition was marked by cracking and disruption of the surface oxide film. A model was proposed that coupled the oxidation rate kinetics of titanium at 650 C with the occurrence of wear at the surface of the oxide film. Author

N75-29251# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik der Luft- und Raumfahrtkonstruktionen.
FATIGUE STRENGTH OF THE TITANIUM ALLOYS Ti 8Al 1Mo 1V, Ti 5Al 2.5Sn AND Ti 6Al 4V AT HIGH TEMPERATURES [SCHWINGFESTIGKEIT DER TITANLEGIERUNGEN Ti 8Al 1Mo 1V, Ti 5Al 2,5Sn UND Ti 6Al 4V BEI HOHEN TEMPERATUREN]
John H. Argyris, Werner Aicher, and Gerhard Kierner 1974 54 p refs In GERMAN
(Contract T-01-816-I-205)
(ISD-161) Avail: NTIS HC $4.25

The fatigue strength of titanium alloys was investigated at 246 and 340 C. Results of room temperature tests were used for comparison. Results of static and dynamic fatigue tests with different samples are presented in graphical form. ESRO

N75-29252# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
FATIGUE CRACK PROPAGATION DATA FOR TITANIUM SHEET ALLOYS: IMI 318 Interim Report
R. J. H. Wanhill, A. E. Meulman, and W. J. VanDerVet 11 Apr. 1974 94 p refs Sponsored by Neth. Agency for Aerospace Programs
(NLR-TR-74048-U; IR-5) Avail: NTIS HC $4.75

Environmental fatigue crack propagation was investigated in the environments of dry argon, normal air distilled water and 3.5% aqueous NaCl. A general trend of shorter lives and faster crack propagation was found in the order: argon, air, distilled water, and 3.5% aqueous NaCl. Crack propagation rates for longitudinal and transverse specimens were compared. For stress rates equal to 0.667, a difference was found between longitudinal and transverse specimens in sea water. ESRO

N75-29253# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
FRACTOGRAPHY OF FATIGUE CRACK PROPAGATION IN 2024-T3 AND 7075-T6 ALUMINIUM ALLOYS TESTED IN AIR AND VACUUM
R. J. H. Wanhill Apr. 1974 39 p refs Sponsored by Neth. Agency for Aerospace Programs
(NLR-TR-74094-U) Avail: NTIS HC $3.75

Electron fractography and transmission electron microscopy were used to study fatigue crack propagation processes in aluminum alloys tested in vacuum and air. It was found that crack growth occurs cycle-by-cycle in vacuum, but that only for fatigue in air was it possible to relate dislocation substructure band spacings, immediately below the fracture surface, to cyclic crack growth. It is suggested that Tomkins' and Biggs' model of striation formation explains the fractographic features. Author (ESRO)

N75-29254# Illinois Univ., Urbana. Dept. of Civil Engineering.
FATIGUE DATA BANK AND DATA ANALYSIS INVESTIGATION, PHASE 1 Interim Report
J. B. Radziminski, R. Srinivasan, D. Moore, C. Thrasher, and W. H. Munse Jun. 1973 162 p
(PB-240261/8; UILU-ENG-73-2025; Ser-405) Avail: NTIS HC $6.25

A library system was developed for the acquisition, compilation and storage of information relating to the fatigue behavior of metal members and structures. Test data obtained from the various information sources are stored on both data sheets (for individual examination), and on standard computer punch cards. A computer program was developed to sort the data into sets satisfying certain stipulated specimen types and loading conditions. A best-fit S-N curve for each specified data set is then established using a least squares error of estimate and correlation coefficient of the regression line, and the lower tolerance limits for 99 percent survival at 50 percent and 95 percent confidence levels. GRA

N75-29255# Army Foreign Science and Technology Center, Charlottesville, Va.
ALUMINUM ALLOYS: INDUSTRIAL DEFORMABLE, SINTERED AND LIGHT ALUMINUM ALLOYS
F. I. Kvasov and I. N. Fridlyander 30 Oct. 1974 32 p Transl. into ENGLISH from Metallurgiva (Moscow), 1972 p 11-24
(AD-A005984; FSTC-HT-23-0119-75) Avail: NTIS CSCL 11/6

The author discusses the hardening and characteristics of alloys from various multicomponent systems, including binary, ternary and quaternary alloys, their advantages and use. A new standard alphanumerical system for designating various alloys is described. GRA

N75-29256# Air Force Systems Command, Wright-Patterson AFB, Ohio.
HEAT TREATMENT OF THE VT22 ALLOY Foreign Technology Div.
O. V. Kasparova and A. A. Gelbman 26 Nov. 1974 14 p ref Transl. into ENGLISH from Technol. Legkikh Splavov (USSR), no. 2, 1972 p 102-105
(AD-A006005; FTD-MT-24-2755-74) Avail: NTIS CSCL 11/6

The authors examined the basic laws governing a change of the phase composition structure and properties of semi-finished products made from the VT22 titanium alloy of industrial composition depending on the mode of heat treatment. GRA

N75-29257# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Chemistry.
AN ELLIPSOMETRIC INVESTIGATION OF THE UNDERPOTENTIAL DEPOSITION OF LEAD ON GOLD
Jean Horkans, B. D. Cahan, and Ernest Yeager 1 Jan. 1975 24 p refs
(Contract N00014-67-A-0404-0006; NR Proj. 359-451)
(AD-A005915; TR-39) Avail: NTIS CSCL 11/3

Potential scanning ellipsometry has been used to examine the wavelength and potential dependence of the optical constants of the lead layer formed on Au by underpotential deposition from Pb(2+) solution. The two main current peaks in the voltammetry curves of the system can be identified with two different states of the surface film. Neither state has optical constants resembling those of bulk Pb. Both films have an ellipsometrically determined thickness of 1.5 A. The large wavelength dependence of the optical constants of the films indicates a strong interaction of the lead adlayer with the surface layer of the Au substrate. The ellipsometric data are consistent with a model in which the layer formed on the surface at less cathodic potentials is primarily ionic and at cathodic potentials undergoes a transition to a metal-like lead adlayer. GRA

N75-29258# Army Foreign Science and Technology Center, Charlottesville, Va.
EFFECTIVE WAYS OF UTILIZING SYNTHETIC SLAGS IN STEEL MAKING
V. A. Romenets, A. G. Shalimov, E. K. Sivaeva, and P. D.

Kolovertnov 18 Sep. 1974 17 p refs Transl. into ENGLISH from Tr. Mezhvuzovskoi Konf. Sovrem. Probl. Kachestve Stali. (USSR), no. 61, 1970 p 252-258
(AD-A005982; FSTC-HT-23-0040-75) Avail: NTIS CSCL 11/6

The article discusses the areas in which it is economically feasible to use steel treated with synthetic slag. Tests were made on steel for ball bearing steel, boilerplate steel, automobile and aviation parts, etc. The added expense of this treatment of steel is justified in the case of ball bearings and steel for the aviation industry, for diesel and tractor building, etc. In other areas such as instrument steels, non-load bearing parts, etc. the additional cost is unnecessary. Dissemination of information on this type of steel to consumers is inadequate at the present time. GRA

N75-29259# Terra Tek, Inc., Salt Lake City, Utah.
CHARACTERIZATION OF 2014-T651 ALUMINUM ALLOY Final Report, Nov. 1973 - Jul. 1974
R. J. Reid, A. H. Jones, and S. J. Green Nov. 1974 53 p refs
(Contract DAAG46-74-C-0019)
(AD-A006260; TR-74-35; AMMRC-CTR-74-68) Avail: NTIS CSCL 11/6

The mechanical properties of 2014-T651 aluminum alloy were determined at room temperature under various strain rates and stress states. Uniaxial tension and compression tests were performed at strain rates ranging from 0.00001 to 1000/sec. Biaxial stress tests were conducted at rates of 0.0001 and 1/sec. The biaxial stress states were obtained with thin walled tubular specimens loaded with a combination of axial tension/compression, internal pressure, torsion and external pressure with any two loads superimposed for any given test. The experimentally observed yield agrees with the von Mises yield condition. Strain to failure exhibited a high degree of anisotropy; ductility being minimum in the thickness direction. Fracture toughness and pin bearing strength properties were also determined. GRA

N75-29260# Martin Marietta Labs., Baltimore, Md.
EFFECTS OF ENVIRONMENT ON THE MECHANICAL BEHAVIOR OF METALS Final Report, 1 Jan. - 31 Dec. 1974
R. M. Latanision and J. A. S. Green 1974 9 p refs
(Contract N00014-74-C-0279; NR Proj. 036-087)
(AD-A006299) Avail: NTIS CSCL 11/6

Research was directed with the specific objective of providing an improved understanding of the mechanical behavior of metals in electrolytes, with the ultimate view of using such understanding to increase the efficiency of operations such as metal cutting or forming and in the prevention of the environmental degradation of stressed materials, i.e., stress corrosion cracking, hydrogen embrittlement, etc. The mechanical behavior of metal electrodes has been examined from the point of view of the influence of variations in the surface charge density in the electrical double layer, and it has been found that both the flow and fracture characteristics of zinc electrodes is sensitive to such electrocapillary effects. In the case of hydrogen embrittlement, it was demonstrated that the intergranular embrittlement of nickel by cathodic hydrogen is associated with the accumulation of impurities--particularly those that are effective hydrogen recombination poisons--at the grain boundaries. GRA

N75-29261# Naval Ship Research and Development Center, Bethesda, Md.
FINITE ELEMENT FRACTURE MECHANICS ANALYSIS OF TWO-DIMENSIONAL AND AXISYMMETRIC ELASTIC AND ELASTIC-PLASTIC CRACKED STRUCTURES
Peter D. Hilton, L. Nash Gifford, Jr., and Oles Lomacky Nov. 1974 117 p refs
(SF43422210)
(AD-A005880; NSRDC-4493) Avail: NTIS CSCL 11/6

Improved methods for calculating fracture mechanics parameters at critical fatigue and fracture prone areas of complex structural details are summarized. This work is a part of a broader effort aimed at the development of analytical methods for fatigue and fracture analysis of submarine hulls. An approach based on the combination of high order isoparametric finite elements with a singular crack tip element is described and applied to the prediction of elastic stress intensity factor for Mode I or combined Modes I and II crack behavior. Examples of the application of the methods to two-dimensional and axisymmetric problems are presented along with recommendations for future studies and applications. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N75-29262*# Joint Publications Research Service, Arlington, Va.
PROCESS FOR THE PREPARATION OF SINTERED CERAMICS ON A SILICON NITRIDE BASIS
Masaki, Hideyuki, Nagoya, and Aichi Washington NASA Jul. 1975 20 p refs Transl. into ENGLISH from German Patent (Appl. no. 2353093, ref. P 23 53 093.0, 23 Oct. 1973) 20 p Sponsored by NASA
(NASA-TT-F-16439) Avail: NTIS HC $3.25 CSCL 11B

Ceramic material having high heat resistance, high shock-heat resistance, and high strength was prepared using various metal oxides, i.e, aluminum and magnesium oxides. The metallic oxide mixture was heated at 1600 C to 1800 C to form a spinell, and is similar to a conventional sintering process. J.R.T.

N75-29263*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
POLYIMIDE ADHESIVES Patent Application
Donald J. Progar, Vernon L. Bell, and Terry L. SaintClair, inventors (to NASA) Filed 16 Dec. 1974 13 p
(NASA-Case-LAR-11397-1; US-Patent-Appl-SN-532784) Avail: NTIS HC $3.25 CSCL 11A

A process of preparing aromatic polyamide-acids for use as adhesives is described. An equimolar quantity of an aromatic dianhydride is added to a stirred solution of an aromatic diamine in a water or alcohol-miscible ether solvent to obtain a viscous polymer solution. The polymeric-acid intermediate polymer does not become insoluble but directly forms a smooth viscous polymer solution. These polyamic-acid polymers are converted, by heating in the range of 200-300 C and with pressure, to form polyimides with excellent adhesive properties. NASA

N75-29264*# Little (Arthur D.), Inc., Cambridge, Mass.
FLAME RESISTANT ELASTOMERIC POLYMER DEVELOPMENT Final Report, 1 Apr. 1974 - 1 Jun. 1975
J. T. Howarth, S. G. Sheth, and K. R. Sidman 1 Jun. 1975 70 p
(Contract NAS9-13979)
(NASA-CR-144362; ADL-C-77207) Avail: NTIS HC $4.25 CSCL 11G

Elastomeric products were developed for use in the space shuttle program, and investigations were conducted to improve the properties of elastomers developed in previous programs, and to evaluate the possibility of using lower-cost general purpose polymers. Products were fabricated and processed on conventional processing equipment; these products include: foams based on fluorinated rubber flame-retarded compounds with a density of 20-30 pounds/cubic foot for use as padding and in helmets; foams based on urethane for use in instrument packaging in the space shuttle; flexible and semi-rigid films of fluorinated rubber and neoprene compounds that would not burn in a 70% nitrogen, 30% oxygen atmosphere, and in a 30% nitrogen, 70% oxygen atmosphere, respectively for use in packaging or in laminates; coated fabrics which used both nylon and Kelvar fabric substrates, coated with either fluorinated or neoprene polymer compositions to meet specific levels of flame retardancy; and other flame-resistant materials. Author

N75-29265# Princeton Univ., N.J.
POLYDICHLOROPHOSPHAZENE: THERMOMECHANICAL BEHAVIOR Technical Report, Sep. 1974 - Feb. 1975
T. M. Connelly, Jr. and J. K. Gillham Feb. 1975 11 p refs
(Contract N00014-67-A-0151-0024)
(AD-A005911; TR-25) Avail: NTIS CSCL 11/9

Dynamic mechanical data (about 1 Hz) for the inorganic polymer polydichlorophosphazene (NPCl2)n are presented for the temperature range - 180 to 350C. Transitions are located and the effect of high temperature on the transitions and the thermomechanical behavior are examined. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N75-29266# Instituto Nacional de Tecnica Aeroespacial, Madrid (Spain).
OVERALL REACTION RATE AND STOICHIOMETRY FOR THERMAL DECOMPOSITION OF HYDRAZINE
Juan R. Sanmartin [1974] 41 p refs
Avail: NTIS HC $3.75

The isothermal decomposition at constant pressure (up to 40 atmospheres) or constant volume of hydrazine in the gas phase at temperatures around 800 or 1000 K was studied theoretically using the Eberstein-Glassman kinetic mechanism. Initial hydrazine molar fractions of the order of unity were assumed. An asymptotic analysis showed that the process presents several time stages. The results are shown to be useful for the entire 750 to 1050 K range (of interest for analysis of electrothermal engines) and for initial hydrazine molar fractions from unity down to values of the order of 0.01. ESRO

N75-29267# Technological Lab. RVO-TNO, Rijswijk (Netherlands).
IMPROVEMENT OF THE ACCEPTANCE AND SURVEILLANCE CONTROL OF NITRATE ESTER PROPELLANTS. PART 3: COMPARATIVE INVESTIGATION OF STABILITY TESTS FOR NITRATE ESTER PROPELLANTS
W. Verbeek 26 Sep. 1974 14 p refs
(TL-1974-20-Pt-3; TDCK-65497-Pt-3) Avail: NTIS HC $3.25

For the purpose of simplifying the acceptance and surveillance control of nitrate ester propellants, a comparative investigation was conducted of the heat generation test, the methyl-violetpaper test, the Dutch weighing test, the Abel heat test, the NATO-stability test, the measurement of the effective stabilizer content, and the 95 C test. As these tests were based on measurement of different decomposition phenomena, there is hardly any correlation among their results. Stability tests were compared with a heat generation test which judges the hazard of self-ignition, and it is concluded that some requirements deriving from these tests are too severe and some contradictory. The stability of nitrate ester propellant and its safe handling is governed by stabilizer content and other factors. ESRO

N75-29268# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
AUDIBLE AND ULTRASONIC ACOUSTIC EMISSIONS FROM COMPOSITE SOLID PROPELLANTS Final Report
James I. Craig, Warren C. Strahle, and John Palfrey Jan. 1975 45 p refs
(Grant AF-AFOSR-2663-74; AF Proj. 9711)
(AD-A005714; AFOSR-75-0172TR) Avail: NTIS CSCL 21/9

The primary task of this grant was to design, build and check out an acoustics apparatus to measure both audible and ultrasonic acoustic emissions from burning composite solid propellants at pressures to 1000 psia. The check out was achieved with propellants furnished by the Air Force Rocket Propulsion Laboratory. Preliminary results are reported on the acoustic emissions from these propellants in the attachment. The apparatus description is also given in the attachment. GRA

N75-29269# Illinois Univ., Urbana. Center for Advanced Computation.
ENERGY INTENSITY OF BARGE AND RAIL FREIGHT HAULING
May 1974 18 p refs
(Grant NSF GI-35179)
(PB-240012/5; UIUC-CAC-DN-74-127; NSF/RA/N-74-166) Avail: NTIS HC $3.25 CSCL 21D

Results of an energy comparison per ton mile of competing rail freight vs. inland barge freight, including the effects of circuitry and the use of probable competing rail lines instead of national average rail data are presented. GRA

N75-29270# Webb Inst. of Naval Architecture, Glen Cove, N.Y.
FUEL CONSERVATION IN SHIP OPERATIONS
Robert Zubaly Jan. 1975 46 p
(Contract MA-2-4214)
(COM-75-10466/1; NMRC-KP-133) Avail: NTIS HC $3.75 CSCL 21D

A study of ways to reduce fuel consumption by both short-term and long-term changes in operational practices has been made, using two typical North Atlantic container fleets as models. Fuel saving strategies are evaluated, all involving reductions in ship speed. GRA

N75-29271# Little (Arthur D.), Inc., Cambridge, Mass.
TECHNOLOGY AND CURRENT PRACTICES FOR PROCESSING, TRANSFERRING AND STORING LIQUEFIED NATURAL GAS Final Report
D. Allan, S. Atallah, E. Drake, R. Hinckley, and S. Mathias Dec. 1974 205 p
(Contract DOT-OS-40171)
(PB-241048/8; ADL-C-76971) Avail: NTIS HC $7.25 CSCL 21D

Current state-of-the-art safety information related to the design, location, construction, operation and maintenance of facilities required for liquefaction, transfer, storage, and revaporization of natural gas is assembled and summarized. A detailed review of codes, standards and practices pertaining to LNG installations is presented along with an evaluation of present trends in LNG safety requirements. LNG safety research programs completed or in progress are described and key research results summarized. A methodology for quantitative assessment of risks associated with LNG facilities is outlined. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N75-29272 Shock and Vibration Information Center (Defense), Washington, D.C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 7, NO. 5, MAY 1975
May 1975 108 p refs
(AD-A010036/2) Avail: Paper copy available from Shock and Vibration Center, Naval Research Lab., Code 6020, Washington, D. C. 20390. Annual subscription $40.00

Papers, abstracts, book reviews, and news items concerning shock and vibration are presented. For individual titles, see N75-29273 through N75-29276.

N75-29273 Columbia Univ., New York.
DYNAMIC RESPONSE OF FLUID-FILLED SHELLS c39
F. L. DiMaggio *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol: 7, No. 5 May 1975 p 5-12 refs (For availability see N75-29272 20-31)

The steady state and transient response of fluid filled shells is first discussed in general. Then published analytical investigations for spherical, spheroidal and circular cylindrical geometry are reviewed. Author

N75-29274 Loughborough Univ. of Technology (England). Dept. of Mathematics.
OPTIMAL CONTROL CONCEPTS IN THE DESIGN OF TURBINE BLADES AND BLADES c07
B. M. E. DeSilva *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 7, no. 5 May 1975 p 63-76 refs (For availability see N75-29272 20-31)

Procedures are described for automatically synthesizing turbine disk and blade assemblies on a digital computer using

continuum mechanics, control theory and optimization techniques. The weight of a steam turbine disk was minimized subject to specified behavioral and side constraints. The behavioral constraints were restricted so that stresses would be below the yield stress for the material and natural frequencies of vibration would lie outside specified resonance bands. The side tolerances imposed restrictions on the dimensions and tolerances of the disk. A constrained problem in the calculus of variations was formulated, with the control and state variables being determined by the shape and behavior variables respectively. Solutions were obtained by transforming the variational representation into discretized nonlinear programs using a piecewise linear approximation for the shape functions. Author

N75-29275 Idaho Univ., Moscow. Dept. of Mechanical Engineering.
STABILITY AND TRANSIENT MOTION OF A HYDRODYNAMIC HORIZONTAL THREE-LOBE BEARING SYSTEM
c37
G. L. Falkenhagen *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 7, No. 5 May 1975 p 77-92 refs (For availability see N75-29272 20-31)

Several areas of importance in the design of hydrodynamic three lobe bearings were analyzed, in particular the stability of the system. The use of pseudotransient equations indicates that they are a rapid and accurate means for determining equilibrium positions. It was concluded that a lead angle between 60 deg and 120 deg should be used in the design of horizontal three lobe bearings for preloading values of 0.4 or less. Bearing stability and load carrying capacity were found to increase with increased preloading. Stability maps produced from linear bearing theory were shown to be comparable with nonlinear transient analysis. Author

N75-29276 Ohio Univ., Athens. Dept. of Mechanical Engineering.
PARAMETER OPTIMIZATION OF VIBRATION ABSORBERS AND SHOCK ISOLATORS BY ROOT-LOCUS TECHNIQUE
c37
Fan Y. Chen and O. E. Adams, Jr. *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 7, No. 5 May 1975 p 93-100 refs (For availability see N75-29272 20-31)

The design of a damped vibration absorber or shock isolator is viewed as a problem of feedback control. The root locus method of Evans is applied. The method provides an alternative means of representing the frequency response and the determination of the optimum values of some physical parameters. Author

N75-29277*# National Aeronautics and Space Administration. Pasadena Office, Calif.
CRYOSTAT SYSTEM FOR TEMPERATURES ON THE ORDER OF 2 DEG K OR LESS Patent Application
Charles G. Miller (JPL) and James B. Stephens, inventors (to NASA) (JPL) Filed 24 Jul. 1975 23 p
(Contract NAS7-100)
(NASA-Case-NPO-13459-1; US-Patent-Appl-SN-598967) Avail: NTIS HC $3.25 CSCL 20L

A cryostat system is described for cooling a device to temperatures of 2.18 K and less, without storing helium in the superfluid state. The system is comprised of a dewar in which helium is stored, and a coiled counterflow heat exchanger used to provide a path for helium to flow from the dewar into a cavity through a restrictor tube. The pressure in the cavity is regulated by a valve so that the helium is in the form of an aerosol mixture of helium gas and superfluid helium droplets. The superfluid helium droplets form a film which is used to cool a device, such as an LR detector. The gas formed from the superfluid helium film is evacuated through a valve and vented. A single dewar may be connected to several heat exchangers to separately cool several devices to different temperatures. NASA

N75-29278*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
DESIGN AND EVALUATION OF THERMODYNAMIC VENT/SCREEN BAFFLE CRYOGENIC STORAGE SYSTEM
Final Report, 3 Jan. 1974 - 30 Jun. 1975
E. C. Cady Jun. 1975 174 p refs
(Contract NAS3-17801)
(NASA-CR-134810; MDC-G5979) Avail: NTIS HC $6.25 CSCL 20L

A comprehensive analytical program was performed to compare an integrated thermodynamic vent/screen baffle orbital cryogenic propellant storage and transfer system with other concepts. The screen systems were found to be 20% to 29% lighter in weight than a propulsively accelerated Tug-scale LH2/LO2 resupply module. The screen systems were compared with small-scale supercritical storage systems for the space shuttle fuel cell reactant and life support system fluid supply and were lighter by up to 556 kg (1225 lb) for the extended 30-day mission. When compared with high-pressure gas storage for the spacelab atmosphere supply, the screen system saved 79% of the inert system weight for the 30-day mission. An experimental program found that heat flux rates up to 9,450 watts/sq m (3,000 Btu/hr-sq ft) degraded the LH2 bubble point performance of eight screens by a maximum of 12.5%. No effects of helium pressurant, screen material, or LH2 superheat were observed. Author

N75-29279# Oxford Univ. (England). Dept. of Engineering Science.
BUBBLE NUCLEATION AT REAL SURFACES WITH NO PRE-EXISTING GASEOUS PHASE
W. B. Bald Nov. 1974 53 p refs
(OUEL-1110/74) Avail: NTIS HC $4.25

A theoretical analysis was made of vapor nucleation for boiling liquids in contact with real engineering surfaces. If the contact angle is Pi/2, vapor nucleation is likely to occur equally at conical and spherical cavities and machining grooves; while if it is near zero, (as would be expected for cryogenic liquids), initial vapor nucleation should occur predominantly at machining grooves on the surface. To test the validity of these theoretical assumptions considerable experimentation is needed. ESRO

N75-29280# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE IMPACT OF METRICATION ON THE DEFENSE STANDARDIZATION PROGRAM M.S. Thesis
Philip A. Nicholson Nov. 1974 75 p refs
(AD-A006038; GSM/SM/74D-10) Avail: NTIS CSCL 14/2

The thesis explores the question of increased use of the metric system as it impacts the Defense standardization program (DSP). Emphasis is placed on the need for conversions of specifications and standards. Background material on metrology, evolution of the customary system, and development of the metric system is provided. Conversion programs of allied nations are examined to highlight problems and solutions which could be useful in a conversion program in the United States. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N75-29281 British Broadcasting Corp., Kingswood (England). Research Dept.
THE ESTIMATION OF THE SERVICE AREAS OF MEDIUM AND LONG-WAVE BROADCASTING STATIONS
R. A. Rowden and C. P. Bell Jan. 1975 31 p refs
(BBC-RD-1975/1) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

Estimates of the services are derived by considering vertical and horizontal directivity of the transmitting installation, its radiation efficiency, and the influence of the ground constants and of interference from other transmitters. Procedures are given for the preparation of maps showing the position of ground-wave field strength contours, for the determination of the limits of the ground-wave service area in the presence of interference

or fading, and for the determination of the sky-wave service area. M.J.S.

N75-29282 British Broadcasting Corp., Kingswood (England). Research Dept.
DIGITAL VIDEO: DIFFERENTIAL CODING OF PAL COLOUR SIGNALS USING SAME-LINE AND TWO-DIMENSIONAL PREDICTION
V. G. Devereux Jun. 1975 18 p refs
(BBC-RD-1975/20) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

Methods are discussed for reducing the bit-rate required for digital coding of System I video-signals by means of differential pulse-code modulation (DPCM). In the DPCM codes which were investigated, each codeword indicated the difference between a sample of a video signal and a prediction of this sample value based on samples already transmitted in the same and/or previous line-periods. A technique is described for obtaining a good prediction from the previous line of a PAL color video-signal. With a view to finding a system giving broadcast-quality pictures, various D.P.C.M. systems were examined; these required the transmission of three to six per sample at a sampling frequency of three times the PAL color-subcarrier frequency. Subjective tests and measurements of signal-to-quantizing-noise ratio were performed on these systems. Author

N75-29283 British Library Lending Div., Boston Spa (England).
A RADIO TELEPHONE SYSTEM WITH CODE DIVISION MULTIPLEXING
W. Herold 4 Feb. 1975 20 p refs Transl. into ENGLISH from Nachrichtentechn. Z. (West Germany), v. 27, no. 1974 p 253-259
(BLL-PO-3206-(9022.81)) Avail: NTIS Avail: British Library Lending Div., Boston Spa, Engl.: 3 BLL photocopy coupons

The problem of the basic bandwidths requirement of a radio telephone system was investigated along with the possibility of using code division multiplexing in the radio zone and a transmission network with decentralized switching to solve the problem. The results show that approximately the same bandwidths are required for the code- and frequency multiplex system when the number of relation stations is greater than 7. The problem of location was solved by using a cable network to connect radio stations with each other; it works with digital signals, and all radio stations can be simultaneously reached from any point of the network. M.J.S.

N75-29284*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE CHARACTERISTICS OF THE 12 GHz, 200 WATT TRANSMITTER EXPERIMENT PACKAGE FOR CTS
Edward F. Miller, J. L. Fiala, and I. G. Hansen 1975 13 p refs Proposed for Presentation at Electron and Aerospace Systems Conf., Washington, D. C., 29 Sep. - 1 Oct. 1975; sponsored by IEEE
(NASA-TM-X-71773; E-8426) Avail: NTIS HC $3.25 CSCL 17B

The experiment package consists of a 200 W output stage tube (OST) powered by a power processing system (PPS). Descriptions of both the PPS and OST are given. The PPS provides the necessary voltages with a measured dc/dc conversion efficiency of 89 percent. The OST, a traveling wave tube with multiple collectors, has a saturated rf output power of 224 W and operates at an overall efficiency exceeding 40 percent over an 85 MHz bandwidth at 12 GHz. OST performance given includes frequency response, saturation characteristics, group delay, AM to PM conversion, inter-modulation distortion, and two channel gain suppression. Single and dual channel FM video performance is presented. It was determined that for 12 MHz peak to peak frequency deviation on each channel, dual channel FM television signals can be transmitted through the TEP at 60 W, each channel, with 40 MHz channel spacing (center to center).
Author

N75-29285# National Aviation Facilities Experimental Center, Atlantic City, N.J.
DATA LINK SHORT-MESSAGE COCKPIT DISPLAY TEST Final Report, Nov. 1972 - Nov. 1973
Donald Larson Dec. 1974 124 p refs
(AD-A005988; FAA-NA-74-1) Avail: NTIS HC $5.25 CSCL 17/2

Pilot/cockpit displays were evaluated for air traffic control messages. The displays were: (1) gas discharge, (2) light-emitting diodes, (3) fiber optics, and (4) cathode-ray tube displays. Data obtained were in the form of questionnaires and measured controller response time to the messages. The results are used to determine the optimum display for crew environment tests. It was found that, through training and practice, pilot crews can readily set up cockpit procedures and operate in an ATC data link display communications environment. Author

N75-29286# National Aviation Facilities Experimental Center, Atlantic City, N.J.
TEST AND EVALUATION OF A REMOTE CONTROL AND RADIOFREQUENCY REPEATER SYSTEM FOR TELEVISED RADAR DISPLAY APPLICATIONS Final Report, Dec. 1972 - Mar. 1974
James G. Dong Sep. 1974 39 p
(AD-786273; FAA-NA-74-14; FAA-RD-74-140) Avail: NTIS HC $3.75 CSCL 17/2

Engineering models were evaluated of a remote control system (RCS) for a BRITE-2 televised display and a radiofrequency (RF) repeater operating at 14.87 and 15.07 GHz. Major portions of the laboratory tests were achieved during the factory acceptance tests. Testing was directed toward establishing a system configuration appropriate for a satellite airport. The RCS operational capability utilizing a C sub 1 conditioned voice-grade line was assured. The RF repeater was compatible with an existing microwave link which permitted experiments with mixed radar video and alphanumeric data inputs into the RF system. With the addition of the new equipments, system versatility was increased. Author

N75-29287# Lincoln Lab., Mass. Inst. of Tech., Lexington.
AN ANALYSIS OF AIRCRAFT L-BAND BEACON ANTENNA PATTERNS
G. J. Schlieckert 15 Jan. 1975 115 p
(Contract DOT-FA72WAI-261; F19828-C-0002)
(AD-A005569; ATC-37; FAA-RD-74-144) Avail: NTIS HC $5.25 CSCL 17/2

Radiation patterns are examined for L-Band beacon antennas mounted on aircraft ranging from small, single-engine, general aviation aircraft to the Boeing 747. The data analyzed consists of antenna gain values taken in two degree (2 deg) steps over a spherical surface centered at the antenna location. Data from three representative scale model aircraft are studied in detail and show the effects of various airframe structural members on the radiation lobing patterns and the relative performance of antennas located at a number of positions on each scale model aircraft. Significant observations were that: landing gear and flaps complicate the lobing structure but do not introduce many more low gain values; antennas mounted forward of the leading edge of the wing and on the fuselage bottom centerline (not too close to nosewheel) provide the best overall performance; and as an aircraft maneuvers, antenna performance degrades in direct relationship with the severity of the roll or pitch. Author

N75-29288# AEL Service Corp., Farmingdale, N.J.
ELECTROMAGNETIC INTERFERENCE MEASUREMENTS IN ELECTRONIC VOICE SWITCHING EQUIPMENT AREAS Final Report, Apr. - Aug. 1974
Margaretta V. Stone Mar. 1975 72 p
(Contract DOT-FA72NA-728)
(AD-A008925; FAA-RD-75-28; FAA-NA-74-169) Avail: NTIS HC $4.25 CSCL 17/2

Results are presented of a measurement program which was conducted to ascertain the electromagnetic interference (EMI) characteristics of selected spaces within FAA facilities. Measurements were performed at spaces within the Denver air route traffic control center which were designated for installation of part of the electronic voice switching equipment; remaining measurements were performed at a space in the remote communications air/ground site in Millville, N.J., designated for installation of the same equipment. Author

N75-29289*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE DEEP SPACE NETWORK Progress Report
Jun. 1975 163 p refs
(Contract NAS7-100)
(NASA-CR-143289; JPL-PR-42-28) Avail: NTIS HC $6.25 CSCL 17B

The objectives, functions, and organization of the Deep Space Network are summarized along with deep space station, ground communication, and network operations control capabilities. Mission support of ongoing planetary/interplanetary flight projects is discussed with emphasis on Viking orbiter radio frequency compatibility tests, the Pioneer Venus orbiter mission, and Helios-1 mission status and operations. Progress is also reported in tracking and data acquisition research and technology, network engineering, hardware and software implementation, and operations. J.M.S.

N75-29290*# Ohio State Univ., Columbus. ElectroScience Lab.
ATS-6 MILLIMETER WAVELENGTH PROPAGATION EXPERIMENT Quarterly Report, 15 Jul. - 14 Oct. 1974
D. B. Hodge and R. C. Taylor Mar. 1975 16 p refs
(Contract NAS5-21983)
(NASA-CR-143832; ESL-3863-3) Avail: NTIS HC $3.25 CSCL 20N

The fixed 20/30 GHz ground terminal is described in detail; it is being used for path diversity measurements in the ATS-6 millimeter wavelength propagation experiment. The current status and summary of operations are reviewed. Author

N75-29291*# Hughes Aircraft Co., Culver City, Calif.
ELECTRONICALLY STEERABLE MILLIMETER WAVE ANTENNA TECHNIQUES FOR SPACE SHUTTLE APPLICATIONS Interim Report, Sep. 1974 - Feb. 1975
W. H. Kummer Mar. 1975 111 p refs
(Contract NAS5-20726)
(NASA-CR-143813; Rept-2265.30/462) Avail: NTIS HC $5.25 CSCL 17B

A large multi-function antenna aperture and related components are described which will perform electronic steering of one or more beams for two of the three applications envisioned: (1) communications, (2) radar, and (3) radiometry. The array consists of a 6-meter folded antenna that fits into two pallets. The communications frequencies are 20 and 30 GHz, while the radar is to operate at 13.9 GHz. Weight, prime power, and volumes are given parametrically; antenna designs, electronics configurations, and mechanical design were studied. Author

N75-29292*# Agnew Tech-Tran, Woodland Hills, Calif.
STUDY OF METHODS TO SUPPRESS SELF-EXCITATION IN O-TYPE TRAVELING WAVE TUBES (TWT)
V. P. Taranenko and A. A. Mikhin Washington NASA Aug. 1975 22 p refs Transl. into ENGLISH from Radioelektronika (USSR), v. 17, Nov. 1974 p 5-17
(Contract NASw-2789)
(NASA-TT-F-16479) Avail: NTIS HC $3.25 CSCL 20N

A review is made of methods for suppressing self-excitation in high-power O-type traveling wave tubes. The discussion covers partitioning of the slow-wave structures, the method of slowly varying parameters, and the selective-loss method. The most effective means are found to be those involving the circuit sever, isochronism, and selective attenuation. Author

N75-29293*# Lockheed Electronics Co., Houston, Tex.
TEST PLAN/PROCEDURE FOR THE CHECKOUT OF THE USA CABLE COMMUNICATIONS TEST CONFIGURATION FOR THE ELECTROMAGNETIC COMPATIBILITY (EMC) TESTS
J. C. Perry Apr. 1975 60 p
(Contract NAS9-12200)
(NASA-CR-144369; LEC-6025A; JSC-09655) Avail: NTIS HC $4.25 CSCL 17B

A series of electromagnetic compatibility (EMC) tests were conducted in May, 1975 in the Soviet Union. The purpose of the EMC tests was to determine the effects of the operating environment of the Soviet aircraft, Soyuz, upon the electrical performance of the USA's cable communications equipment located in Soyuz. The test procedures necessary to check out the cable communications test configuration in preparation for the EMC tests are presented. Author

N75-29294*# Linkabit Corp., Los Angeles, Calif.
STUDY OF EFFICIENT VIDEO COMPRESSION ALGORITHMS FOR SPACE SHUTTLE APPLICATIONS Final Report
Zung Poo 11 Jun. 1975 66 p refs
(Contract NAS2-8297)
(NASA-CR-137708) Avail: NTIS HC $4.25 CSCL 17B

Results are presented of a study on video data compression techniques applicable to space flight communication. This study is directed towards monochrome (black and white) picture communication with special emphasis on feasibility of hardware implementation. The primary factors for such a communication system in space flight application are: picture quality, system reliability, power comsumption, and hardware weight. In terms of hardware implementation, these are directly related to hardware complexity, effectiveness of the hardware algorithm, immunity of the source code to channel noise, and data transmission rate (or transmission bandwidth). A system is recommended, and its hardware requirement summarized. Simulations of the study were performed on the improved LIM video controller which is computer-controlled by the META-4 CPU. Author

N75-29295# Joint Publications Research Service, Arlington, Va.
ORGANIZATION AND PLANNING OF TELECOMMUNICATIONS ENTERPRISES
M. G. Karmazov, I. A. Traubenberg, and I. V. Petrushin 29 Jul. 1975 317 p Transl. into ENGLISH of the book "Organizatsiya i Planirovaniye Predpriyatiy Elektricheskoy Svyazi" Moscow, Izdatelstvo Svyaz, 2 Oct. 1973 p 1-264
(JPRS-65331) Avail: NTIS HC $9.25

A description of the problems of the organization and planning of enterprises of local telephone service, toll centers, telegraphy, radio broadcasting and television. The facsimile network, network of newspaper proof page transmission, and switched and nonswitched networks of digital data transmission are also covered. Author

N75-29296# Urwick, Currie and Partners Ltd., Montreal (Quebec).
DATA TERMINAL TECHNOLOGY, PRESENT AND FUTURE. VOLUME 1: STATE-OF-THE-ART
R. G. Fujaros, ed. Ottawo Communications Res. Centre Apr. 1975 116 p refs
(CRC-1276-1-Vol-1) Avail: NTIS HC $5.25

Data terminal products currently available within Canada and those not yet available which have potential for significant future impact on the Canadian terminal market are surveyed. The products are classified according to major terminal types for each of which the approximate number installed in Canada and the price range are presented. The products were examined with respect to their physical and functional implementation, and the cost and extent of use of the various underlying technologies for the different terminal types are presented. Author

N75-29297# Urwick, Currie and Partners Ltd., Montreal (Quebec).
DATA TERMINAL TECHNOLOGY, PRESENT AND FUTURE. VOLUME 2. TECHNOLOGY FORECASTING AND ASSESSMENT
R. G. Fujaros, ed. Ottawa Communications Res. Centre Apr. 1975 206 p refs
(CRC-1276-2) Avail: NTIS HC $7.25

A preliminary forecast and impact assessment of technologies related to interactive data terminals covering the period 1973 to 1985 is presented. Primary emphasis is on a systematic, detailed identification of the hardware and software technologies underlying present and potential future terminal types and on carrying out an exploratory forecast of the technologies. Some performance and cost trends for the technologies are presented. Less emphasis is placed on the assessment of impact of these technologies on the evolution of specific data terminal types. Quantitative cost effectiveness and cost-benefit techniques for assessment of relative attractiveness of competing terminal types are also outlined. Author

N75-29298# DCF Systems Ltd., Toronto (Ontario).
DATA TERMINAL STANDARDS AND PROTOCOLS
R. G. Fujaros, ed. Apr. 1975 112 p refs Sponsored by Commun. Res. Centre
(CRC-1275) Avail: NTIS HC $5.25

Available standards and protocols applicable to the design and use of interactive data communication terminals and associated equipment are identified, classified and cataloged with respect to the operator and communication line interfaces of the terminal. The utility and influence of, and adherence to, published and unpublished standards and protocols are assessed. Major influencing factors in their development and use, and the current trends in their evolution are presented. Particular emphasis is placed on those standards and protocols available worldwide which are likely to have most impact within Canada. Author

N75-29299*# Computer Sciences Corp., Silver Spring, Md.
STUDY PLAN TO IDENTIFY LONG TERM NATIONAL TELECOMMUNICATIONS NEED AND PRIORITIES APPLYING DELPHI TECHNIQUES (HANDBOOK)
Jul. 1974 270 p refs
(Contract NAS5-24011)
(NASA-CR-143833) Avail: NTIS HC $8.50 CSCL 17B

A handbook that explains the basic Delphi methodology and discusses modified Delphi techniques is presented. The selection of communications experts to participate in a study, the construction of questionnaires on potential communications developments, and requisite technology is treated. No two modified Delphi studies were the same, which reflects the flexibility and adaptability of the technique. Each study must be specifically tailored to a particular case, and consists of seeking a consensus of opinion among experts about a particular subject and attendant conditions that may prevail in the future. Author

N75-29300# Royal Radar Establishment, Malvern (England).
A REVIEW OF CLUTTER, 1974
M. P. Warden and E. J. Dodsworth Sep. 1974 36 p refs
(RRE-TN-783; BR44348) Avail: NTIS HC $3.75

Land, weather, and bird radar clutter are discussed. The present state of knowledge on various clutter characteristics, such as the probability distributions of clutter cross sections and spectral distributions, are summarized. Various types of clutter models and their use are dealt with. A mathematical clutter model and a surveillance radar clutter environmental model are annexed. ESRO

N75-29301# Signals Research and Development Establishment, Christchurch (England).
GOSPRE: A SIMPLE ANALYTICAL PROGRAM FOR COMPUTING GRADE OF SERVICE IN A HEAVILY LOADED COMMUNICATIONS NETWORK
F. B. Johnson Aug. 1974 21 p
(SRDE-74018; BR44152) Avail: NTIS HC $3.25

A simple analytical procedure was devised, together with a computer program for applying it, whereby system average quantities such as Grade of Service are predicted for a communications network operating under conditions where relatively heavy traffic makes source and sink blocking a more significant cause of call attempt failure than is blockage on the trunk part of the network. The program is designed to handle a situation where the offered traffic arises from subscriber units which may have from 1 up to 8 independent connections into the network.
Author (ESRO)

N75-29302# Heinrich-Hertz-Institute fuer Schwingungsforschung, Berlin (West Germany).
APPLICATIONS OF THE PARCOR COEFFICIENTS FOR LINEAR PREDICTION OF STATIONARY PROCESSES [ANWENDUNGEN DER PARCOR-KOEFFIZIENTEN FUER DIE LINEARE PRAEDIKTION STATIONAERER PROZESSE]
Rainer Zelinski 1974 47 p refs In GERMAN
(TB-173) Avail: NTIS HC $3.75

The concept of the partial autocorrelation (PARCOR) coefficient was investigated for linear prediction in digital voice processing. Various possibilities of interpretation are discussed. It is shown that the PARCOR coefficients can be interpreted as a redundance-free representation of the autocorrelation coefficient since they only describe the appropriate admissible range of values of the autocorrelation function. The significance and application of the PARCOR coefficients are explained in detail. ESRO

N75-29303# Marconi Co. Ltd., Chelmsford (England). Research Div.
DESIGN, MANUFACTURE AND TEST OF AN ELECTRICAL MODEL OF A SHAPED BEAM ANTENNA FOR A MARITIME SATELLITE Final Report
Dec. 1974 170 p refs
(Contract ESRO-SC/13/73-HQ)
(ESRO-CR(P)-644) Avail: NTIS HC $6.25

Optimum beamshapes are defined which can be obtained at the specified operating frequencies with 2 m aperture. The basic synthesis problem is discussed, and three analytical (modal synthesis, ruze synthesis, and spherical wave synthesis) techniques used. It is found that the theoretical beamshape can be optimized to given an absolute gain of 20.7 db at edge of coverage (8.8 deg from boresight). Three alternative antenna configurations (front-fed shaped reflector, circular array of helices, and hybrid) are considered. A C-band scale model of the proposed antenna configuration is detailed. Preliminary range tests show a strong reflector feed interaction which has the effect of an RF performance. Solutions are proposed to overcome this difficulty and to obtain an improved RF performance. The effects of reflector profile errors and reflector cut-outs on antenna electrical performance are analyzed. ESRO

N75-29304# AEG-Telefunken, Ulm (West Germany).
SPEECH SIGNAL PROCESSING Final Report [SPRACHSIGNALVERARBEITUNG]
Guenther Gertheiss, Klaus Fellbaum, Helmut Mangold, Helmut Schunk, and David Stall Bonn Bundesmin. fuer Forsch. und Technol. Dec. 1974 209 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Forsch. und Technol.
(BMFT-FB-T-74-44) Avail: NTIS HC $7.25; ZLDI, Munich 43,90 DM

Results of investigations in processing the information content of speech signals for further use in automatic data processing, such as transmission, automatic recognition, and synthesis of speech signals, are reviewed. ESRO

N75-29305# National Physical Lab., Teddington (England). Div. of Computer Science.
A STUDY OF BIFURCATED ROUTING IN A DATA NETWORK AND THE EFFECT OF ISARITHMIC FLOW CONTROL IN THIS CONTEXT
W. L. Price Mar. 1974 19 p refs
(NPL-Com-72) Avail: NTIS HC $3.25

A routing doctrine is defined as that algorithm by which a node in a data communication network holding a packet for onward transmission selects the output link along which the packet is next to proceed and, therefore, also chooses the next node to be visited. It is shown that application of isarithmic flow control, with five permits provided per node and five allowed to wait for incoming traffic at each node (5/5), to a simple network causes hardly any reduction in the maximum carrying capacity of the network, however, the more restrictive isarithmic parameters (3/3 and 2/2) produce an unacceptable throttling effect. If bifuraction is applied, it should be applied only to through traffic, and it must be accompanied by an enhanced flow control such as is offered by the isarithmic system. ESRO

N75-29306# Technology Service Corp., Santa Monica, Calif.
ADAPTIVE ANGLE TRACKING Final Report
Lawrence E. Brennan and Irving S. Reed 7 Feb. 1975 83 p refs
(Contract N00019-74-C-0227)
(AD-A006279; TSC-PD-119-4) Avail: NTIS CSCL 17/9

Angle tracking with phased array antennas in an external noise environment was studied. While the results of this study are applicable generally to arrays of sensors for measuring the angle of arrival of incident radiation, the emphasis in the simulation portion of the study was placed on radar arrays operating in a jamming environment. This problem is important in a variety of radar ECCM applications, including AI radars and missile seekers. Two different approaches to the adaptive angle tracking problem were included in the study. The first approach

is based on maximization of the likelihood function. The second basic approach to angle tracking in a jamming environment is based on the use of symmetrical pairs of array elements. GRA

N75-29307# Illinois Univ., Savoy. Aviation Research Lab.
PATTERN AND MOTION CHARACTERISTICS OF VISUALLY TIME-COMPRESSED TARGET DETECTION IN STATIC NOISE
Jeffrey D. Moll and Robert C. Williges Oct. 1974 11 p refs
(Contract F44620-70-C-0105; AF Proj. 9778)
(AD-A006384; ARL-74-17/AFOSR-74-12; AFOSR-75-0385TR)
Avail: NTIS CSCL 05/10

An experiment was performed testing different pattern and motion cues for enhancement of detection rates in visual search for linear target patterns imbedded in heavy static noise. Eight subjects participated in a factorial, within-subject design which included the number of spots in a target pattern. Time required to detect and designate targets was used as the dependent variable. Displays were presented via a computer-controlled plasma panel equipped with a touch-sensing device for target pattern designation. Results are discussed in terms of the relationship among the pattern and motion cues. GRA

N75-29308# American Electronic Labs., Inc., Lansdale, Pa.
LOW-LEVEL MODULATOR AND ISOLATOR-LIMITER-DETECTOR DEVELOPMENT Final Report, 15 Jun. - 16 Dec. 1974
Donald L. Talhelm 16 Dec. 1974 25 p
(Contract N00014-74-C-0393; ONR Proj. 10077)
(AD-A006296) Avail: NTIS CSCL 09/5

The report summarizes the development of a low-level modulator and isolator-limiter-detector for use in the UHF range. Test data on insertion loss, attenuation, isolation, VSWR and response times are included for the modulator. For the isolator-limiter-detector data on tangential signal sensitivity (TSS) and VSWR are presented. GRA

N75-29309# Mitre Corp., Bedford, Mass.
AFBITS EXPERIMENTAL EQUIPMENT EVALUATIONS
W. T. Grinnell Feb. 1975 100 p refs
(Contract F19628-73-C-0001; AF Proj. 7040)
(AD-A006192; MTR-2815) Avail: NTIS CSCL 17/2

The Air Force Base Information Transfer System (AFBITS) is a broadband, multimode communications system for the transfer of audio, digital, and video information over coaxial cable on Air Force Bases. An experimental equipment configuration was established in order to facilitate the laboratory evaluation of the concept and the problems that may be encountered in the system implementation. This paper discusses the characteristics of the equipment used, and the implementation and operational problems encountered during the evaluation of the experimental configuration. GRA

N75-29310# McGill Radar Weather Observatory, Ste. Anne de Bellevue (Quebec).
RAIN ATTENUATION STUDIES Interim Report
G. Drufuca Mar. 1973 105 p refs
(Contract F19628-73-C-0052; AF Proj. 6672)
(AD-A006123; SR-3; AFCRL-TR-73-0352) Avail: NTIS CSCL 17/2

The statistical properties of rain attenuation which dominate propagation at frequencies above 10 GHz are required for planning radio systems at these frequencies. These properties are studied for three frequencies, 11.2, 12.7 and 18.76 GHz and various link lengths, 2.5, 5, 7.5, 10, 12.5 and 15 mi at six locations in Canada. Two approaches were used to simulate the attenuation; one utilizes weather radar data in the AZLOR format, a rectangular coordinate variation of PPI; the other utilizes rainguage records and radiosonde data and the concept of a synthetic storm. Rain attenuation statistics are developed from these two approaches to describe the probability of occurence of an attenuation event for single links of various length, pairs of parallel links with various separation distance and for pairs of links on the same route. GRA

N75-29311# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOME CHARACTERISTICS OF A COMMUNICATION SATELLITE MULTIPLE-BEAM ANTENNA
Leon J. Ricardi, Alan J. Simmons, Andre R. Dion, Lorne K. DeSize, and Bing M. Potts 28 Jan. 1975 62 p refs
(Contract F19628-73-C-0002)
(AD-A006405; TN-1975-3; ESD-TR-75-1) Avail: NTIS CSCL 09/5

The note describes a waveguide lens antenna system excited by a variable beam-forming network capable of producing a wide range of radiation patterns. These patterns vary from a narrow high-gain beam, equivalent to that of a steerable paraboloid, to the earth-coverage pattern of a wide-coverage communication satellite. GRA

N75-29312# Illinois Univ., Chicago. Dept. of Information Engineering.
NUMERICAL TECHNIQUES FOR ELECTROMAGNETIC SCATTERING Final Report, 1 Jun. 1973 - 30 Nov. 1974
Sharad R. Laxpati 1975 16 p refs
(Grant AF-AFOSR-2547-73; AF Proj. 9749)
(AD-A006459; AFOSR-75-0309TR) Avail: NTIS CSCL 20/14

The report consists of several parts. A detailed summary of the research carried out and important results are discussed in Section II. Section III provides a list of journal articles and a report, with related abstracts, which have been supported by this grant. Finally, the personnel supported through this grant are listed in the last section. GRA

N75-29313# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
DIGITAL DOPPLER PROCESSING USING WALSH AND QUANTIZED FOURIER TRANSFORMS
J. L. Ekstrom Nov. 1974 79 p refs
(Contract N00017-72-C-4401)
(AD-A006116; APL-TG-1265) Avail: NTIS CSCL 09/4

The use of Walsh and Fourier transforms to synthesize banks of contiguous Doppler filters is examined in considerable detail for 32-point transforms and in less detail for 256-point transforms. It is found that the use of Walsh or hard-limited Fourier transforms results in the introduction of numerous large spurious sidelobes or artifacts in the filter responses, and that these artifacts are essentially unaffected by input signal amplitude tapering. It is shown how the artifacts may be reduced in size and number by increasing the number of quantization levels in the Fourier transform. GRA

N75-29314# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
IONOSPHERIC EFFECTS ON TRANSIONOSPHERIC MEASUREMENTS OF RANGE AND RANGE DIFFERENCE
V. L. Pisacane and M. M. Feen Oct. 1974 57 p refs
(Contract N00017-72-C-4401)
(AD-A006118; APL-TG-1267) Avail: NTIS CSCL 17/7

The report discusses several alternatives that are available by which to minimize the influence of the ionosphere on transionospheric measurements of range and range difference. The alternatives considered involve using the dispersive nature of the ionosphere or the use of estimation techniques. The dispersive nature of the ionosphere makes it possible to use phase and/or group-path length measurements on one or more frequencies to correct the major portion of the ionospheric induced range error. The mathematical basis for this approach is presented. Two studies involving the near real time estimation of the first order ionospheric induced range error are discussed. These studies are presented in order to define the current state of the art of existing estimation techniques. A review of the variations of the ionosphere in the middle latitudes is given to set a limit on the potential of the accuracy of existing estimation techniques. GRA

N75-29315# Naval Research Lab., Washington, D.C.
EVALUATION OF ALGORITHMS FOR LINEAR ARRAY BEAMFORMING ON THE AN/UYK-17 (XB-1) (V) SIGNAL PROCESSING ELEMENT
Judith N. Froscher 28 Jan. 1975 49 p
(AD-A006251; NRL-7833) Avail: NTIS CSCL 17/1

An overview of linear passive array beamforming is presented, the respective advantages of time-domain and frequency-domain beamforming are examined with processing by the Signal Processing Arithmetic Unit (SPAU) in mind, and three frequency-

domain beamforming algorithms are analyzed. The SPAU has two's complement, fixed-point, rounded arithmetic. Through SPAU simulation, the effects of quantization are studied for two cases. First, the effect that quantization error has on the suppression of a weak signal in the desired direction by a strong interfering signal is examined by the determination of discrepancies between ideal and fixed-point response curves. Second, a statistical study is undertaken to ascertain whether the error due to finite register length produces any major divergence from perfect results when a weak signal response is polluted with noise. Finally, the three frequency-domain algorithms are studied with regard to the efficient use of the SPAU's hardware. GRA

N75-29316# Naval Research Lab., Washington, D.C.
A SCAN CONVERTER RADAR DISPLAY SYSTEM Final Report
Nathan V. ONeal and Paul M. Thiebaud Jan. 1975 29 p
(NRL Proj. R02-65)
(AD-A005881; NRL-MR-2979) Avail: NTIS CSCL 17/9

A radar display system, designed to integrate on a single display target information from several radars, has been designed and evaluated. Integration is obtained through the use of single gun scan converter tubes. The resultant image on the TV monitor is a bright steady PPI image which is updated at the end of each radar scan. Limitations imposed on the display by scan converter characteristics such as resolution, dynamic range, image uniformity and image registration are discussed. The system as configured does not provide a useful display, although the technique does achieve certain operator oriented advantages, such as a bright steady display. GRA

N75-29317# Institute for Telecommunication Sciences, Boulder, Colo.
ANALYSIS OF PROBLEMS IN THE APPLICATION OF RADAR SENSORS TO AUTOMOTIVE COLLISION PREVENTION Final Report, Jan. 1974 - Jan. 1975
R. A. Chandler, L. E. Wood, and L. A. Jacobson Mar. 1975 306 p refs
(Contract DOT-HS-4-00813)
(PB-240950/6; DOT-HS-801-452) Avail: NTIS HC$9.25 CSCL 13F

The report describes the technical feasibility of using radar sensors for automatic automotive braking systems. Radar signatures of typical vehicular targets at 35 GHz and 60 GHz are shown. Results are compared with GHz signatures obtained earlier. Tracking radar systems and their feasibility in the automotive application are discussed with respect to the problem of potentially high false alarm rates caused by highway curves. The problem of intersystem blinding is considered in depth, and estimations are made of the effectiveness of polarization isolation and frequency-hopping in reducing blinding effects. The performance of diplex radar systems in blinding configurations is discussed. Preliminary specifications are recommended as guidelines for judging the acceptability of prototype systems for marketing. GRA

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N75-29318* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ELECTRIC ARC LIGHT SOURCE HAVING UNDERCUT RECESSED ANODE Patent
Delbert G. VanOrnum (Giannini Scientific Corp.), William A. Geideman, Jr. (Giannini Scientific Corp.), and Kurt Muller, inventors (to NASA) (Giannini Scientific Corp.) Issued 23 Sep. 1969 8 p Filed 11 Oct. 1966 Continuation-in-part of US Patent Appl. SN-453241, filed 29 Apr. 1965 Sponsored by NASA
(NASA-Case-ARC-10266-1; US-Patent-3,469,143; US-Patent-Appl-SN-585988; US-Patent-Class-315-111; US-Patent-Appl-SN-453241) Avail: US Patent Office CSCL 09A

A light or radiation source is described in which the light emanates from a high-current electric arc. This source, the vortex-stabilized radiation source, is characterized by high efficiency and arc stability, long electrode life at high power levels, readily-controllable emission, and other advantages.
Official Gazette of the U.S. Patent Office

N75-29319# National Aviation Facilities Experimental Center, Atlantic City, N.J.
POWER INTERRUPT EQUIPMENT Final Report, Sep. - Nov. 1973
Paul John OBrien May 1975 21 p
(AD-A010009; FA-NA-74-60; FAA-RD-75-63) Avail: NTIS HC $3.75 CSCL 09/3

Special test equipment was designed and fabricated to create controlled power interruptions to electronic equipment. The test equipment, designated Power Interrupt Equipment (PIE), interrupts and restores power at precise phase angles. This capability enables specific types and periods of outage to be caused so that outage effects on the unit or system under test can be analyzed. Maximum inrush current is also produced so that its effects on circuit breakers and the operation of the unit or system under test can be analyzed. The PIE was found capable of satisfying the requirements for interrupting and restoring power at precise phase angles. This test equipment facilitates test and evaluation of equipment with respect to the capability of handling power interruptions. Author

N75-29320*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TRIELECTRODE CAPACITIVE PRESSURE TRANSDUCER Patent Application
Grant W. Coon, inventor (to NASA) Filed 17 Jul. 1975 23 p
(NASA-Case-ARC-10711-2; US-Patent-Appl-SN-596788) Avail: NTIS HC $3.25 CSCL 09A

A capacitive transducer and circuit especially suited for making measurements in a high temperature environment was developed. The transducer includes two capacitive electrodes and a shield electrode. As the temperature of the transducer rises, the resistance of the insulation between the capacitive electrode decreases and a resistive current attempts to interfere with the capacitive current between the capacitive electrodes. The coupling of the shield electrode and the circuit reduces the resistive current in the transducer. A bridge type circuit coupled to the transducer ignores the resistive current and measures only the capacitive current flowing between the capacitive electrodes. NASA

N75-29321# Physics Lab. RVO-TNO, The Hague (Netherlands).
EFFICIENCY OF A PHASED ARRAY ANTENNA AS A FUNCTION OF PHASE SHIFTER LOSS AND MISMATCH DUE TO MUTUAL COUPLING
J. Snieder Oct. 1974 25 p
(PhL-1974-31; TDCK-65318) Avail: NTIS HC $3.25

The efficiency of a space fed phased array antenna for various mismatch and loss conditions is calculated using a network model. An experimental verification for the correctness of this model is given. It is shown that the result can be used for any type of phase shifter. The obtained transmission percentage was found to be strongly dependent on the magnitude of the mismatches and of the phase shifter loss. Author (ESRO)

N75-29322# Physics Lab. RVO-TNO, The Hague (Netherlands).
A WIDE-ANGLE SCAN MATCHING TECHNIQUE FOR AN INFINITE PLANE PHASED ARRAY ANTENNA
H. J. VanSchaik Oct. 1974 70 p refs
(PhL-1974-33; TDCK-65441) Avail: NTIS HC $4.25

Numerical solutions, in particular for the CAISSA antenna, are presented for the problem of radiation from an iris-loaded, infinite phased array antenna of rectangular waveguides, partially filled with dielectric, plus an external dielectric sheath. Some attention is given to the blinds-scan angle effect, which occurs under certain circumstances. From the numerical and practical results it can be concluded that the loss due to mutual coupling between the waveguides can be reduced strongly for the wide

angle scan when using a suitable external dielectric sheath.
Author (ESRO)

N75-29323# Physics Lab. RVO-TNO, The Hague (Netherlands).
COMPARISON OF SOME CLASSES OF MTI FILTERS FOR A 3-PULSE CANCELLER WITH STAGGERED PRF
P. J. A. Prinsen Nov. 1974 19 p refs
(PhL-1974-38; TDCK-65596) Avail: NTIS HC $3.25

Three classes of MTI filters were compared with respect to their performance: optimum coefficients, VanDerMonde coefficients, and binomial coefficients. The comparison was made by numerically computing the improvement factor as a function of the stagger rate for a 3-pulse canceller for different values of the spectral width of the clutter. Author (ESRO)

N75-29324# Physics Lab. RVO-TNO, The Hague (Netherlands).
THE ESTIMATION OF THE DIRECTION OF RADAR TARGETS
W. A. Dijk Jan. 1975 52 p refs
(PhL-1975-01; TDCK-65789) Avail: NTIS HC $4.25

With a planair phased array antenna, azimuth and elevation of reflecting targets can be estimated in many different ways. What the fundamental relation is between the obtainable estimation accuracy of the target angles on one hand and the target echo signal-to-interference ratio and the system parameters on the other is described for a linear array and for different monopulse systems. Clutter and thermal noise were used as interference models. Author (ESRO)

N75-29325# Centre National d'Etudes Spatiales, Toulouse (France).
RESULTS OF IRRADIATION TESTS ON VARIOUS ELECTRONIC COMPONENTS [RESULTATS D'ESSAIS D'IRRADIATION EFFECTUES SUR DIVERS COMPOSANTS ELECTRONIQUES]
Francois Linder Mar. 1975 26 p In FRENCH; ENGLISH summary
(CNES-NT-11) Avail: NTIS HC $3.75

The results of irradiation tests on various electronic components, with particular application to Symphonie and Argos satellite projects, are evaluated. Data cover proper use of components and the development of various other equipments.
Author (ESRO)

N75-29326# Ohio State Univ., Columbus. ElectroScience Lab.
MAN-PACK LOOP ANTENNA SYSTEM Final Report, 15 Oct. 1973 - 31 Dec. 1974
C. H. Walter, P. Bohley, and R. J. Davis Dec. 1974 39 p refs
(Contract N00123-74-C-0645)
(AD-A006278; ESL-3824-2) Avail: NTIS CSCL 09/5

The report summarizes the work accomplished in developing a multiturn loop (MTL) antenna for use with the AN/PRC-77 and AN/PRC-25 manpack transceivers. Design goals were an omnidirectional azimuth pattern with signal levels similar to those of the AT-892/PRC-25 3 foot whip with minimum increase in transceiver shape or size. Patterns of the final MTL configuration selected are shown. The development of an autotuner for use with the MTL is described. The final MTL system including autotuner was built as an add-on system mounted below the transceiver next to the small of the operators back. The attenuation and enhancement effects of the human body close to the radiating element are presented along with conclusions and recommendations for further study. GRA

N75-29327# Silicon Transistor Corp., Chelmsford, Mass.
PRODUCTION ENGINEERING MEASURE FOR HIGH CURRENT, FAST SWITCHING TRANSISTORS Quarterly Progress Report, 19 Jul. - 19 Oct. 1974
Frederick G. Ernick Dec. 1974 25 p
(Contract DAAB05-73-C-2032)
(AD-A005666; QPR-7) Avail: NTIS CSCL 09/1

During the period, another lot of transistors intended for First Article Testing was processed. Preliminary electrical screening was performed to insure this lot did not fail. The previous lot failed because it did not meet the high current saturation voltage requirements. This was tentatively attributed to the collector portion of the starting epitaxial material being either too thick or too high in resistivity. Group A electrical data is presented. Group B testing was begun. GRA

N75-29328# Physical Electronics Labs., Menlo Park, Calif.
BROADBAND FERRITE LIMITERS Final Report, Jul. 1973 - Jul. 1974
S. S. Elliott and Sidney T. K. Nieh Nov. 1974 58 p refs
(Contract DAAB07-72-C-0305; DA Proj. 1S0-62102-A-42)
(AD-A005279; ECOM-72-0305-F) Avail: NTIS CSCL 09/1

The object of the program is to develop broadband frequency selective ferrite limiters in the frequency ranges from 12 - 14 GHz and from 14 - 16 GHz. The prototypes built for this program have limiting threshold less than 100 mw, dynamic range greater than 20 db and small signal insertion loss of 1 db over a temperature range of -32C to +85C. With peak input power of 10W, the spike leakage is less than 3 ergs. When input peak power is 10 db above threshold, 1 db compression of a small signal occurs 20 MHz away. GRA

N75-29329# National Bureau of Standards, Washington, D.C.
SEMICONDUCTOR MEASUREMENT TECHNOLOGY Quarterly Report, 1 Apr. - 30 Jun. 1974
W. Murray Bullis Feb. 1975 74 p refs
(ARPA Order 2397)
(AD-A005669; NBS-SP-400-8) Avail: NTIS CSCL 09/1

Contents: Resistivity; dopant profiles; crystal defects and contaminants; oxide film characterization; test patterns; photolithography; epitaxial layer thickness; wafer inspection and test; interconnection bonding; hermeticity; thermal properties of devices. GRA

N75-29330# Illinois Univ., Urbana. Dept. of Computer Science.
BURP: A BUNDLE REPEATER AND RESTORER
Bernard Kapang Tse Dec. 1974 51 p refs
(Contract N00014-67-A-0305-0024)
(AD-A006354; UIUC-DCS-R-74-689) Avail: NTIS CSCL 09/2

This thesis examines the problem of broken wires in bundles: It is shown that a much better approximation to the original information can be obtained by connecting the ends of broken wires to an arbitrary neighbor in a so-called repeater. Further investigation leads to the conclusion that the problem of attrition in numerator/denominator bundle systems (i.e. the decrease in the absolute value of active wires upon multiplication) can be mapped onto the broken wire problem, i.e. that a restorer can be built which is quite similar to a repeater. In both cases tri-state logic is used in the relevant circuits. GRA

N75-29331# General Electric Co., Syracuse, N.Y. Heavy Military Equipment Dept.
COMPUTER-AIDED AMPLIFIER DESIGN IN BASIC
L. Rider Jul. 1974 84 p refs
(AD-A006370; R74EMH15) Avail: NTIS CSCL 09/1

The report covers six computer programs which may be used as design aids in the synthesis of active or passive linear two-port networks. These programs may be used in designs for any device which can be described by a set of two-port S-parameters. The program PARAM permits conversion of other two-port parameter sets to S-parameters. The TRANSAMP program provides stability information and constant gain contours. TRANSG computes the transducer gain of a two-port network from reflection coefficients. TRANZ computes the input or output reflection coefficients and impedances. TRANSFIX computes gain circles for specified termination impedances. TGAIN computes the transducer gain of a circuit having fixed-topology transmission line matching networks. Two sample designs are given to illustrate the use of the programs. A complete listing of all the programs is included. GRA

N75-29332# Army Foreign Science and Technology Center, Charlottesville, Va.
FEATURES OF USING REVERSING THYRISTOR EXCITERS WITH SEPARATE CONTROL IN ELECTRIC DRIVE SYSTEMS
O. I. Osipov and Yu. S. Usynin 5 Jun. 1974 12 p ref Transl. into ENGLISH from Sb. Statei. Chelyabinsk. Politekh. Inst. (USSR), no. 94, 1971 p 109-117

(AD-A006088; FSTC-HT-23-385-74) Avail: NTIS CSCL 09/3

Features of reversing thyristor exciters (RTE) with separate control were examined, using the example of exciters of cold rolling mill stand generators. Wiring diagram and performance curves are presented and operation of the system is discussed. Means of controlling voltage auto-oscillation in the system, including use of flexible voltage feedback, are discussed. GRA

N75-29333# Army Foreign Science and Technology Center, Charlottesville, Va.

THYRISTOR CONTROL OF AN INDUCTIVE CAPACITIVE CONVERTER FOR CHARGING CAPACITIVE ENERGY TANKS

V. M. Vakulenko 29 Oct. 1974 11 p refs Transl. into ENGLISH from Probl. Tekhn. Elektrodinamiki (USSR), no. 29, 1971 p 61-65

(AD-A006080; FSTC-HT-23-953-74) Avail: NTIS CSCL 10/3

The circuit for a single-phase T-shaped converter with electronic commutator in the form of two anti-parallel connected thyristors is described. Use of the converter in charging several capacitive energy tanks is detailed. GRA

N75-29334# Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.

VARIABLE PULSE WIDTH MODULATOR EXPLORATORY DEVELOPMENT MODEL Final Technical Report, 1 Jul. 1973 - 30 Nov. 1974

Duane R. Torgerson Nov. 1974 57 p refs

(Contract DAAB07-73-C-0267; DA Proj. 1S6-62705-A-055)

(AD-A006258; ECOM-0267-3-73) Avail: NTIS CSCL 09/5

The report presents the final results of the Variable Pulse Width Modulator Basic Switch module. Test results operating at 1000 volts and 25 amperes are presented along with projections for further modulator developments. GRA

N75-29335# Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.

ACOUSTIC SIGNAL PROCESSING DEVICES (SURFACE WAVE TRANSDUCER STUDY) Final Report, 1 May 1973 - 30 Nov. 1974

W. R. Smith Feb. 1975 42 p refs

(Contract DAAB07-73-C-0175; DA Proj. 1S6-62703-A-057)

(AD-A006257; FR-75-14-89; ECOM-73-0175-F) Avail: NTIS CSCL 09/1

The objective of the program has been to expand and refine the analysis and design of interdigital surface wave transducers. The report describes a new three-port circuit model analysis which, on the basis of comparison with experimental results, gives an excellent description of the operation at arbitrary harmonics of single and double electrode transducers with arbitrary metallization ratios and polarity sequences. Two other areas of investigation which are summarized in this report were described in detail in the previous Semi-Annual Report for this contract. The first is an experimental study establishing the crossed field Mason bulk wave model as giving an accurate description of acoustic reflections in transducers operating near acoustic synchronism. The model described in Section Two of this report extends these results to higher harmonic operation. The second additional area is a design procedure whereby nondispersive filters with any reasonably smooth pass band shape may be synthesized using nonperiodic transducers with practically no appodization. Three devices were successfully built using this procedure. GRA

N75-29336# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANALYSIS OF FIRES CAUSED BY SHORT CIRCUITS IN CABLE NETWORKS IN MINES IN THE UKRAINIAN SSR

V. P. Charkov and S. P. Grekov 6 Dec. 1974 13 p Transl. into ENGLISH from Donetsk Gornospasatelnoe Delo Sbornik (USSR), no. 4, 1971 p 19-23

(AD-A006002; FTD-HC-23-2564-74) Avail: NTIS CSCL 08/9

For the purpose of studying the dynamics of fires caused by short circuits in cable networks, determining the degree of influence of various factors on their occurrence, and getting probability curves for predicting such fires in the next few years, the authors systematized and processed mathematically data about fires in cables in mines of the Ukrainian Donbass for 1955 - 1969. GRA

N75-29337# Westinghouse Research Labs., Pittsburgh, Pa.

SUPERCONDUCTING WINDINGS Semiannual Report

Michael S. Walker and John H. Murphy Feb. 1975 40 p refs

(Contract N00014-73-C-0461)

(AD-A006476; Rept-75-9C31-CRYEL-R1; SAR-2) Avail: NTIS CSCL 09/1

Work performed to examine transient field losses in practical superconductors is reported. Experimental and theoretical papers and reports which have been generated under this contract and through related activities are listed. A tentative mathematical model is presented describing losses for superconductors under operating conditions anticipated for naval applications, particularly as they relate to the Navy's program in superconducting electrical propulsion machinery. GRA

N75-29338# Radio Corp. of America, Burlington, Mass. Government Communications and Automated Systems Div.

MANUFACTURING METHODS AND TECHNOLOGY PROGRAM AUTOMATED IMAGE DEVICE EVALUATOR (AIDE) Quarterly Progress Report, 1 Jul. - 30 Sep. 1974

J. F. McCarthy Oct. 1974 37 p refs

(Contract DAAB05-74-C-2524)

(AD-A006546) Avail: NTIS CSCL 09/1

The purpose of the contract is to establish a manufacturing method and technology program for Automated Image Device Evaluator (AIDE) which will provide a computer controlled test system capable of performing production acceptance testing of second generation image intensifier tubes at the manufacturer's plant. GRA

N75-29339# Naval Postgraduate School, Monterey, Calif.

INDUCED CURRENTS ON TWO DIMENSIONAL ELECTROMAGNETIC PLANAR STRUCTURES M.S. Thesis

Jose Alberto Rospigliosi Balta and Richard W. Adler Dec. 1974 107 p refs

(AD-A005733; NPS-52AB74124) Avail: NTIS CSCL 20/14

Electromagnetic pulse has become a possible threat to nearly all sophisticated military systems. The crossed dipole receiving antenna has been used as a representative model to approximate electromagnetic pulse effects on aircraft. A very basic way to approximate an aircraft structure is by a two-dimensional cross. The paper is an application of the Piecewise-Sinusoidal Reaction Matching Technique (PSRMT) to find the current density distribution in a two-dimensional cross illuminated by a monochromatic plane wave. Other two-dimensional structures are solved previous to the cross structure in order to gain insight and to validate this approach with respect to previous solution techniques. GRA

N75-29340# Magnetic Corp. of America, Waltham, Mass.

SHORT-PULSE SWITCHES FOR AIRBORNE HIGH-POWER SUPPLIES Final Report, Jun. 1972 - Jun. 1974

Richard J. Thome Jan. 1975 147 p refs

(Contract F33615-72-C-2098; AF Proj. 3145)

(AD-A006107; AFAPL-TR-74-88) Avail: NTIS CSCL 09/1

Switching systems for use with pulsed inductive energy storage systems were investigated with the goal of designing for a peak current interrupt capability of 20,000 A at a repetition rate of 5 pps with a voltage following interruption of 100 kV. A charge time of 190 msec or more was desired with switch losses limited to 5,000 j/pulse for a total pulse train length of 300 pulses. Both linearly actuated and rotary devices were considered with means for incorporating an applied magnetic field and cryogenic cooling in the switch design. A design is given for a prototype linearly actuated switch for evaluation of the field and cooling effects and for a rotary switch based on high performance filamentary brushes designed for operation at 3,000 A/sq in. Test results were obtained in the program with filamentary brushes operating at this overall current density. Current densities in the filaments were as high as 9,000 A/sq in. GRA

N75-29341# Lockheed Missiles and Space Co., Palo Alto, Calif. Research Lab.

AN EXPERIMENTAL STUDY OF REACTION PROFILES IN POROUS ELECTRODES.
T. Katan and S. S. Szpak 14 Feb. 1975 43 p refs
(Contract N00014-73-C-0397)
(AD-A005773; LMSCI-D409290; TR-3) Avail: NTIS CSCL 10/3

An electrode for monitoring the time-dependent distribution of transfer current density in porous electrodes is developed. When applied to the Ag/AgCl system, predicted behavior is obtained, showing interaction of resistances manifested within the pores and on the pore walls. Good correlation is found of the developed experimental electrode to a porous structure similar to those of practical interest. GRA

N75-29342# Army Foreign Science and Technology Center, Charlottesville, Va.
A THYRISTOR dc SWITCH
M. V. Gelman 15 Apr. 1974 5 p Transl. into ENGLISH from Russian Patent no. 304697 (1971)
(AD-A005957; FSTC-HT-23-91-74) Avail: NTIS CSCL 09/1

A switch for circuits having capacitive loads is described. The design differs from earlier configurations in that the small holding resistance is eliminated from the thyristor switching circuit and thermistor with a positive resistive temperature characteristic is employed. The design is intended to reduce power losses. GRA

N75-29343# Army Foreign Science and Technology Center, Charlottesville, Va.
AN INVESTIGATION OF THE INFLUENCE OF THE WET SURFACE AREA OF A POSITIVE ELECTRODE ON THE ENERGY CONVERSION EFFICIENCY DURING THE ELECTRICAL EXPLOSION OF CONDUCTORS
V. K. Rakhuba, V. A. Korotkov, G. A. Nesvetailov, and N. N. Stolovich 1 Jun. 1974 10 p refs Transl. into ENGLISH from Akad. Nauk BSSR, Minsk. Vestsi. Seryya Fizika Enerhetychykh Nauk (USSR), no. 1, 1972 p 60-64
(AD-A005971; FSTC-HT-23-0426-74) Avail: NTIS CSCL 10/1

Some experimental results of energy release upon the electrical explosion of conductors are presented. It is shown that an anode surface area, unlike the case of free discharge, has no great influence on the deformed membrane characteristics checked. Some recommendations for electrode systems geometry using exploding conductors are given. GRA

N75-29344# Army Foreign Science and Technology Center, Charlottesville, Va.
CHARACTERISTICS OF ENERGY RELEASED IN A CHANNEL FORMED BY AN EXPLODING WIRE
V. N. Ocheretin 20 May 1974 6 p refs Transl. into ENGLISH from Elektroiskrovaya Obrab. Metal. (USSR), v. 3, no. 39, 1971 p 74-75
(AD-A005959; FSTC-HT-23-131-74) Avail: NTIS CSCL 19/1

A theoretical study is made of the conditions for energy release in a discharge channel by an exploding wire, at which the maximum power is successfully obtained. It was found that the energy density in the channel is determined mainly by the magnitude of the discharge current and the discharge channel radius, and that the energy density is greater in materials with greater magnetic permeability, i.e., steel or iron, rather than copper, aluminum or brass. The study showed that the skin effect can be disregarded. GRA

N75-29345# Cornell Univ., Ithaca, N.Y. Materials Science Center.
COUPLING CONSIDERATIONS FOR SQUID DEVICES
J. H. Claassen 10 Feb. 1975 40 p refs
(Contract N00014-67-A-0077-0016; NR Proj. 319-032)
(AD-A006324; MSC-2225; TR-18) Avail: NTIS CSCL 09/1

Most applications of superconducting quantum interference devices (SQUIDs) involve use of a coupling coil. There are two classes of such applications: magnetometry (magnetic field, field gradient) and voltage or current measurements. The author has analyzed the factors which determine the ultimate sensitivity, and presents a guide for optimization of signal/noise in each of the two cases. It is found that a single figure of merit, involving both the equivalent input noise of the SQUID and the effectiveness of the coupling to the coil, is applicable to either type of measurement. It is proposed that this figure of merit be used in evaluating the performance of new SQUID designs. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N75-29346+ Engineering Sciences Data Unit, London (England).
A GUIDE TO THE VISCOSITY OF LIQUID PETROLEUM PRODUCTS
Jan. 1971 25 p refs Sponsored by Inst. of Mech. Engr. and Inst. of Chem. Engr.
(ESDU-71003) Avail: NTIS HC $50.50

The ranges of the kinematic viscosity and density of various classes of liquid petroleum products are tabulated, and the effects of temperature on viscosity and density are charted along with the effect of pressure on the dynamic viscosity of petroleum. A method for predicting the viscosities of blends of two petroleum products, which is based on the standard kinematic viscosity-temperature charts is described. F.O.S.

N75-29347 British Library Lending Div., Boston Spa (England).
FLOW MECHANISMS AND NOISE IN CONTROL VALVES WITH MODEL TESTS IN THE NEAR SONIC AND SUPERSONIC RANGE
O. Heinrich 4 Feb. 1975 23 p refs Transl. into ENGLISH from VGB Kraftwerkstechnik (West Ger.), v. 54, no. 6, 1974 p 374-384
(BLL-CE-Trans-6607-(9022.09)) Avail: British Library Lending Div., Boston Spa, Engl.: 3 BLL photocopy coupons

By means of examples from fluid mechanics which involve turbulent, near sonic and supersonic flow, the cause of wide-band sound emission and excitation of vibrations in control valves is demonstrated. To confirm processes of this kind taking place in practice, fundamental model tests were carried out as a research project in a supersonic wind tunnel. The tests and their results are described. Author

N75-29348 British Library Lending Div., Boston Spa (England).
APPLICATION OF THE FINITE ELEMENT METHOD TO FLUID PROBLEMS
M. Ikenouchi and N. Kimura Jun. 1975 29 p refs Transl. into ENGLISH from Mitsui Zosen Giho (Japan), no. 81, 1973 p 44-53
(BLL-RTS-9414) Avail: British Library Lending Div., Boston Spa, Engl.: £10.00; 16 BLL photocopy coupons

The finite element method of analysis is illustrated by using the variation principle and finite element equations, which are to be applied to the fluid problems, together with the result of calculations made by using the calculation program formed from those equations. Results of a study on the cavitation of a diesel engine cylinder liner are presented as an example of the application to a practical problem. Author

N75-29349 British Library Lending Div., Boston Spa (England).
DROP FORMATION FROM SINGLE NOZZLES AT HIGH NOZZLE VELOCITIES IN LIQUID-LIQUID SYSTEMS
M. Hozawa and T. Tadaki Jun. 1975 14 p refs Transl. into ENGLISH from KagakuKogaku (Tokyo), v. 37, no. 8, 1973 p 75-81 Presented at the 36th Meeting of Chem. Eng. Society, Apr. 1971
(BLL-RTS-9364) Avail: British Library Lending Div., Boston Spa, Engl.: £5.00; 8 BLL photocopy coupons

In determining the effectiveness of such liquid-liquid extraction apparatus as spray extraction towers and multi-perforated plate towers, it is necessary to predict the particle sizes of dispersed liquid droplets. Single droplet formation range, laminar flow droplet formation range, and droplet formation in a turbulent flow droplet formation range and in a spray range were studied. A simple method of estimation of liquid droplet diameters and

their distributions in a high flow velocity range was proposed. Results of the study are presented. Author

N75-29350# National Aerospace Lab., Tokyo (Japan).
ON TURBULENT DIFFUSION IN COAXIAL JETS OF DISSIMILAR GASES WITH PRESSURE GRADIENT
Shigeaki Nomura Oct. 1974 16 p refs
(NAL-TR-392T) Avail: NTIS HC $3.25

Focusing the attention upon the field with the axial pressure gradient, the turbulent diffusion in the coaxial jets of dissimilar gases was investigated theoretically. Dealing with the mean values of the turbulent flow, the turbulent diffusion coefficient was modeled by means of employing the solutions for the linearized species equation as obtained by Libby and Kleinstein. The turbulent wake equations involving this diffusion model were solved numerically. Comparing these solutions with the existing experimental results, the following conclusions are drawn: (1) for the jet mixing without the pressure gradient, the present diffusion model provides excellent predictions of axial and radial profiles both for concentration and velocity; (2) for the case with large axial pressure gradient, the axial profile of concentration and temperature could be predicted satisfactorily, but the velocity profile could not; and (3) though Sc sub t, Pr sub t and Le sub t were proved to be constant throughout the mixing field without pressure gradient, Sc sub t was found not to be constant for the case with pressure gradient. Author

N75-29351*# Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
WIND TUNNEL GENERATION OF SINUSOIDAL LATERAL AND LONGITUDINAL GUSTS BY CIRCULATION OF TWIN PARALLEL AIRFOILS
Norman D. Ham, Paul H. Bauer, and Thomas L. Lawrence Aug. 1974 32 p refs
(Contract NAS2-7262)
(NASA-CR-137547; ASRL-TR-174-3) Avail: NTIS HC $3.75 CSCL 20D

A gust generator capable of producing sinusoidal lateral and longitudinal gusts was developed for the purpose of studying the gust response of a model rotor-propeller in a wind tunnel. The gust generator utilized harmonic circulation control of twin parallel airfoils to achieve the harmonic lift variation required for gust generation. The gust generator design, construction, and testing is described. Typical test results are presented in the form of lateral and longitudinal gust perturbation velocities as a function of generator reduced frequency. Author

N75-29352*# Agnew Tech-Tran, Woodland Hills, Calif.
THE MEASUREMENT OF THE THERMAL SLIP OF GASES
M. Czerny and G. Hettner Washington NASA Jul. 1975 12 p ref Transl. into ENGLISH from Z. Physik (West Germany), v. 30, 1924 p 258-267
(Contract NASw-2789)
(NASA-TT-F-16476) Avail: NTIS HC $3.25 CSCL 20D

The tangential force between a disk suspended from a quartz fiber at uniform temperature and a stationary plate having a temperature gradient was measured in the presence of H, He, and air. The effect of gas pressure and distance between the plates was studied. All measurements agreed with theory.
Author

N75-29353*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTALLY DETERMINED AEROACOUSTIC PERFORMANCE AND CONTROL OF SEVERAL SONIC INLETS
Brent A. Miller 1975 22 p refs Proposed for presentation at 11th Propulsion Conf., Anaheim, Calif., 29 Sep. - 1 Oct. 1975; cosponsored by AIAA and SAE
(NASA-TM-X-71767; E-8422) Avail: NTIS HC $3.25 CSCL 20D

Low speed wind tunnel tests were conducted to determine the aeroacoustic performance of several model sonic inlets. The results were analyzed to indicate how inlet aeroacoustic characteristics were affected by inlet design and operating conditions. A system for regulating sonic inlet noise reduction was developed and tested. Results indicate that pressure losses at forward velocity may be substantially less than those at static conditions. This is particularly true for translating centerbody inlets with the centerbody extended in the approach and landing position. Operation to simulated takeoff incidence angles of 50 degrees was demonstrated with good inlet performance. Inlet sound pressure level reduction was regulation was regulated to within approximately + or - 1 dB by controlling inlet surface static pressure measured at the diffuser exit. Author

N75-29354# National Aerospace Lab., Tokyo (Japan).
THREE-DIMENSIONAL FLOW FIELD DUE TO A RADIAL VORTEX AND SOURCE LINE SPANNING AN ANNULUS
Atsuhiro Tamura Aug. 1974 34 p refs
(NAL-TR-378T) Avail: NTIS HC $3.75

A theoretical investigation of the three dimensional potential flow field due to a radial vortex and source line spanning an annulus is carried out. The three dimensional effects due to finite radius hub and annulus walls are found to be appreciable, especially for a low hub/tip ratio configuration. The discrepancy between the two and three dimensional solutions are found to be large near the hub, moderate at the tip, and negligibly small at the mid radius. Author

N75-29355# National Aerospace Lab., Tokyo (Japan).
THREE-DIMENSIONAL INVISCID EFFECTS IN AXIAL FLOW TURBOMACHINERY AND LIMITATION OF CASCADE THEORY
Atsuhiro Tamura Aug. 1974 38 p refs
(NAL-TR-379T) Avail: NTIS HC $3.75

The calculation was based on the method of distributed singularities; the blades are represented by a series of line vortices and line sources which have their axes along the radial direction and are arranged along the blade camber surface. The basic perturbed velocity fields due to radial vortex lines of constant strength and radial source lines of variable strength were computed from a modified theory based on Tyson's and Rossow's formulation. A computer program was developed to obtain the three dimensional flow field in a turbomachinery with arbitrary number of blades, number of singular points per blade, and various hub/tip ratios. Examples are presented illustrating the three dimensional effects due to hub/tip ratio, stagger angle, number of the blades. The effects of the radial variation of the strength of the radial source line were examined. The three dimensional effects are found to be appreciable for low hub/tip configuration with fewer number of blades. Author

N75-29356*# LTV Aerospace Corp., Dallas, Tex. Vought Systems Div.
DEVELOPMENTS IN CONVECTIVE HEAT TRANSFER MODELS FEATURING SEAMLESS AND SELECTED DETAIL SURFACES, EMPLOYING ELECTROLESS PLATING
C. J. Stalmach, Jr. 30 Jun. 1975 101 p refs
(Contract NAS9-13692)
(NASA-CR-144364; TR-2-57110/5R-3227) Avail: NTIS HC $5.25 CSCL 20D

Several model/instrument concepts employing electroless metallic skin were considered for improvement of surface condition, accuracy, and cost of contoured-geometry convective heat transfer models. A plated semi-infinite slab approach was chosen for development and evaluation in a hypersonic wind tunnel. The plated slab model consists of an epoxy casting containing fine constantan wires accurately placed at specified surface locations. An electroless alloy was deposited on the plastic surface that provides a hard, uniformly thick, seamless skin. The chosen alloy forms a high-output thermocouple junction with each exposed constantan wire, providing means of determining heat transfer during tunnel testing of the model. A selective electroless plating procedure was used to deposit scaled heatshield tiles on the lower surface of a 0.0175-scale shuttle orbiter model. Twenty-five percent of the tiles were randomly selected and plated to a height of 0.001-inch. The purpose was to assess the heating effects of surface roughness simulating misalignment of tiles that may occur during manufacture of the spacecraft.
Author

N75-29357*# Kanner (Leo) Associates, Redwood City, Calif.
A NEW CONCEPT OF MODELING THE PROCESS OF HEAT TRANSFER ON SURFACES WITH ARTIFICIAL ROUGHNESSES AND MICROFINS
M. Perlman Washington NASA Aug. 1975 10 p refs

Transl. into ENGLISH from Bul. Inst. Politeh. Iasi (Romania), v. 18(22), no. 1-2, 1972 p 77-82
(Contract NASw-2790)
(NASA-TT-F-16506) Avail: NTIS HC $3.25 CSCL 20M

Attempts made to establish a method of analysis for heat transfer on surfaces with artificial roughness and microfins are discussed. The study of physical processes under these conditions leads to the idea that the relationship between the height of the roughnesses and the thickness of the limiting layer, denoted as the geometric-dynamic characteristic, may constitute a criterion whose effectiveness in the study of these phenomena is demonstrated. By introducing the characteristic ratio and establishing its relation to this criterion, a model for the transmission of heat with these phenomena and a simplified calculation method over a wide range of applications is obtained. Author

N75-29358*# Kanner (Leo) Associates, Redwood City, Calif.
THE DISTURBANCE OF THE MIXING REGION OF TWO PLANAR JETS BY MEANS OF A SHOCK WAVE
V. Boekemeir Washington NASA Aug. 1975 13 p refs
Transl. into ENGLISH from Abh. Rheinisch-Westfaelische Tech. Hochschule (Aachen), v. 21, 1974 p 25-29
(Contract NASw-2790)
(NASA-TT-F-16507) Avail: NTIS HC $3.25 CSCL 20D

Nonstationary mixing processes, such as occur in pulsating jet apparatuses or which can be observed under certain operating conditions with nonpulsating ones, are associated with wave propagation. Experimental and computational results are presented in a graph. There are significant differences between experimental findings and the theoretical data in some positions even at a greater distance from the vortex center. Author

N75-29359*# Advanced Technology Labs., Inc., Westbury, N.Y.
AN IMPROVED NUMERICAL PROCEDURE FOR THE PARAMETRIC OPTIMIZATION OF THREE DIMENSIONAL SCRAMJET NOZZLES
S. Dash and P. D. DelGuidice May 1975 87 p refs
(Contract NAS1-13303)
(NASA-CR-132695; ATL-TR-215) Avail: NTIS HC $4.75 CSCL 20D

A parametric numerical procedure permitting the rapid determination of the performance of a class of scramjet nozzle configurations is presented. The geometric complexity of these configurations ruled out attempts to employ conventional nozzle design procedures. The numerical program developed permitted the parametric variation of cowl length, turning angles on the cowl and vehicle undersurface and lateral expansion, and was subject to fixed constraints such as the vehicle length and nozzle exit height. The program required uniform initial conditions at the burner exit station and yielded the location of all predominant wave zones, accounting for lateral expansion effects. In addition, the program yielded the detailed pressure distribution on the cowl, vehicle undersurface and fences, if any, and calculated the nozzle thrust, lift and pitching moments. Author

N75-29360*# Advanced Technology Labs., Inc., Westbury, N.Y.
MANUAL FOR IMPROVED SOURCE FLOW CHARACTERISTICS PROGRAM
Paul D. DelGuidice May 1975 84 p ref
(Contract NAS1-13303)
(NASA-CR-132696; ATL-TM-183) Avail: NTIS HC $4.75 CSCL 20D

A FORTRAN IV program for analyzing the nozzle flow for a hypersonic scramjet by a two dimensional second order characteristic procedure is presented. Author

N75-29361*# Advanced Technology Labs., Inc., Westbury, N.Y.
AN IMPROVED SOURCE FLOW CHARACTERISTIC TECHNIQUE FOR THE ANALYSIS OF SCRAMJET EXHAUST FLOW FIELDS
P. DelGuidice and S. Dash May 1975 32 p refs
(Contract NAS1-13303)
(NASA-CR-132697; ATL-TR-213) Avail: NTIS HC $3.75 CSCL 20D

The process is discussed of designing a nozzle for a hypersonic airbreathing vehicle which involves a complex study of the inter-relationship among many parameters: internal-external expansion, vehicle lift, drag, pitching moments, and structural and weight limitations. The source flow characteristic approach to the design process was extended and improved, and streamline interpolation procedure was incorporated. All characteristic and boundary calculations were made compatible with frozen, equilibrium and ideal gas thermodynamic options, while slip surface calculations (cowl interaction) were extended to underexpanded flow conditions. Since viscous forces can significantly influence vehicle forces, pitching moments and structural/weight considerations, a local integration via flat plate boundary layer skin friction and heat transfer coefficients was included. These effects are calculated using the Spalding and Chi method, and all force and moment calculations are performed via integration of the local forces acting on the specified vehicle wetted areas. Author

N75-29362*# Little (Arthur D.), Inc., Cambridge, Mass.
RADIATION COOLER FOR 10 MICROMETER WAVELENGTH ENGINEERING MODEL RECEIVER MODEL NO. 7172, SERIAL NO. 201 Final Report
May 1975 53 p
(Contract NAS5-20087)
(NASA-CR-144662; C-77096) Avail: NTIS HC $4.25 CSCL 20M

The design, fabrication, and testing of a radiative cooler are described. This cooler is an engineering model suitable for bench testing in the laboratory as a part of the 10-micrometer wavelength engineering model receiver, and conforms to the standard radiative cooler configuration, except that the inner stage and its support system were redesigned to accommodate the larger, heavier SAT detector. This radiative cooler will cool the detector to cryogenic temperature levels when the receiver is in a space environment or in a suitable thermal vacuum chamber. Equipment specifications are given along with the results of thermal tests, vibration tests, and electrical integrity tests. Author

N75-29363# Stuttgart Univ. (West Germany). Inst. fuer Kernenergetik.
ESTOQ: A PROGRAM FOR CALCULATION OF PRIMARY SHOCK SOURCES FOR AVOIDANCE OF RAY-EFFECTS WITH TWO DIMENSIONAL S SUB N CALCULATIONS [ESTOQ: EIN PROGRAMM ZUR BERECHNUNG VON ERSTSTOSSQUELLEN ZUR VERMEIDUNG DES RAY-EFFEKTS BEI ZWEIDIMENSIONALEN SN-RECHNUNGEN]
W. Klumpp, G. Pfister, and G. Rexer Aug. 1973 84 p refs In GERMAN
(Rept-4-17) Avail: NTIS

Elimination of the ray effect in two dimensional S sub N calculations is obtained by regarding the stipulated source as a primary shock source. A computer program is presented for shielding calculations on a cylindrical r-z geometry that allows for anisotropic radiation entry through the lid of the cylinder. Transl. by G.G.

N75-29364# National Aeronautical Establishment, Ottawa (Ontario).
NONLINEAR SPATIAL WAVE DEVELOPMENT IN AN AXISYMMETRICAL TURBULENT JET
Y. Y. Chan Apr. 1975 52 p refs
(NRC-14756) Avail: NTIS HC $4.75

A detailed analysis is presented of the nonlinear development of a spatial-growth wave disturbance in the turbulent shear layer of a circular jet. The method of analysis is based on the global consideration of the energy transfer between the mean flow, the turbulence, and the wave fluctuation in the shear layer. For the correlation functions required for the integral formulation, those of the mean and the turbulent flows of the jet are calculated numerically by a finite difference method, and those of the wave fluctuations were obtained from a linear stability theory of divergent flow. The predicted development of the wave is in agreement with the experimental data. Author

N75-29365*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
CROSSFLOW IN TWO-DIMENSIONAL ASYMMETRIC NOZZLES
Daniel I. Sebacher and Louise P. Lee Washington Aug. 1975 32 p refs

(NASA-TN-D-7999; L-10072) Avail: NTIS HC $3.75 CSCL 20D

An experimental investigation of the crossflow effects in three contoured, two-dimensional asymmetric nozzles is described. The data were compared with theoretical predictions of nozzle flow by using an inviscid method of characteristics solution and two-dimensional turbulent boundary-layer calculations. The effect of crossflow as a function of the nozzle maximum expansion angle was studied by use of oil-flow techniques, static wall-pressure measurements, and impact-pressure surveys at the nozzle exit. Reynolds number effects on crossflow were investigated. Author

N75-29366# Technische Hogeschool, Delft (Netherlands). Dept. of Mechanical Engineering.

NUMERICAL CALCULATION OF TWO CLASSES OF POTENTIAL PROBLEMS, ILLUSTRATED WITH THE FLOW FROM A CHANNEL AGAINST A WEDGE

J. VanDerZanden Mar. 1975 42 p refs Submitted for publication

(WTHD-71) Avail: NTIS HC $3.75

The stationary, irrotational, nonviscous, incompressible flow of a gas issuing from a channel against a wedge is considered as an approximation of the potential flow in a channel with an elbow. The resulting two-dimensional problem was treated with conformal mapping, and the inversion problem was solved numerically. It is claimed that the developed approach will be useful for two classes of potential problems. Author

N75-29367# Oxford Univ. (England).

FILM COOLING EFFECTIVENESS FROM ROWS OF HOLES UNDER SIMULATED GAS TURBINE CONDITIONS

M. R. Smith, T. V. Jones, and D. L. Schultz London Aeron. Res. Council 1974 65 p refs Supersedes ARC-34738 Sponsored jointly by Sci. Res. Council and Min. of Defence

(ARC-CP-1303; ARC-34738) Avail: NTIS HC $4.25; HMSO £1.40; PHI $5.80

Film cooling tests using coolant injection through rows of discrete holes are described. A shock tunnel was used to provide a transient mainstream flow (M = 0.2, 0.5 or 0.7) at stagnation temperatures of 500, 1000, and 2000 K. Wall heat transfer rates were measured with and without coolant injection using thin film gauges. The results were analyzed using the boundary layer film cooling model parameter x bar and the mass and momentum flux ratios as correlating parameters. The latter give good correlation of the experimental data and a useful comparison with data obtained by other workers under different conditions. The correlated data may also be used as a prediction for film cooling in any situation and as a test for new theoretical models of the film cooling process. ESRO

N75-29368# Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.

CONICAL STAGNATION POINTS IN THE SUPERSONIC FLOW AROUND SLENDER CIRCULAR CONES AT INCIDENCE

P. G. Bakker and W. J. Bannink Nov. 1974 84 p refs

(VTH-184) Avail: NTIS HC $4.75

Local solutions to the flow equations are discussed along with a solution to the problem of supersonic flow based on linearized theory. It is shown that the conical stagnation point, occuring as a node of conical streamlines in the intersection point of the leeward symmetry plane and the conical surface, lifts off from the cone surface if the angle of incidence exceeds the cone half-angle. For a given configuration and depending on the Mach number the position of the nodal point is then found to be below the free stream direction. If the results of linearized theory are approximated further to obtain the slender-body results, solutions of the flow pattern similar to those of Smith are found. It was shown that in general the conical stagnation points can only occur as nodal or as saddle points. In the vicinity of conical stagnation points a nodal point of streamlines corresponds to a saddle point of isobars and a saddle point of streamlines corresponds to a centerpoint of isobars. Author (ESRO)

N75-29369# Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.

NUMERICAL INTEGRATION OF THE MOMENTUM-INTEGRAL EQUATIONS AND APPLICATION OF THE RESULTS TO THE FLOW BETWEEN ROTATING DISKS

B. C. Chandrasekhara Aug. 1974 63 p refs

(VTH-183) Avail: NTIS HC $4.25

Laminar boundary layers were investigated which are on rotating disks of finite radius contained in a stationary cylinder filled with a fluid of constant properties, with or without a uniform transverse magnetic field; von Karman's -T method was used. A parabolic relation is assumed for the tangential velocity distribution which is in agreement with the model considered. Important flow quantities such as the radial mass flow in boundary layers, the axial out-flow velocity, the boundary layer thickness, and the amplitude of radial velocity are computed from numerical integration. Results of the analysis indicate that the axial out-flow velocity exhibits inward or outward flowing layers for values of Kappa greater than 0.5 and the boundary layer thickness and radial mass flow also exhibit marked change in behavior for Kappa greater than 0.5. The secondary flow in end-wall boundary layers depends on the tangential Reynolds number and can be reduced by increasing the length of the cylinder or decreasing the tangential Reynolds number. The presence of a uniform transverse magnetic field reduces the boundary layer thickness; the axial out-flow velocity exhibits outward and inward flowing layers at low values of Kappa. Author (ESRO)

N75-29370# Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.

MEASUREMENTS AT THE LEEWARD SIDE OF A CONE AT LARGE INCIDENCES IN SUPERSONIC FLOW

R. Houwink Dec. 1974 65 p refs

(VTH-186) Avail: NTIS HC $4.25

The leeward flow field of a 7.5 deg half angle cone at incidences between 14 and 35 deg was investigated in a Mach 3 flow. The investigation was carried out in a supersonic blowdown wind tunnel. A qualitative investigation of the leeward flow structure at incidences between 16 and 25 deg using schlierenphotographs and pitot tube transverses indicates a symmetric and approximately conical flow field with vortices and imbedded shockwaves. Above an incidence of about 28 deg the flow is nonconical and asymmetric. At these large incidences a steady asymmetric system of vortices seems to be present, separating periodically with distance from the cone tip from the leeward cone surface. At angle of attack between 16 and 25 deg the distribution of flow properties in the leeward plane of symmetry was determined using pitot probes and a static pressure/directional wedge probe. Results indicate an expansion toward the cone surface, at incidences above 20 deg causing a conically supersonic velocity just above an oblique shockwave close to the leeward cone surface. The distribution of conical Mach number has a maximum value about halfway between the cone surface and the free stream direction. At incidences of 21.65 and 25 deg a vortical singularity-like stagnation point and a near-wake stagnation point are present. Author (ESRO)

N75-29371# Army Foreign Science and Technology Center, Charlottesville, Va.

ANALYSIS OF FLOW IN A BISTABLE FLUIDIC ELEMENT TO IMPROVE ITS CHARACTERISTICS

I. V. Lebedev 6 Apr. 1974 13 p refs Transl. into ENGLISH from proceedings of 4th conf. on Intern. Fluidics (USSR), 14-18 Oct. 1972 10 p, paper B-4

(AD-A006087; FSTC-HT-23-1639-73; Paper-B-4) Avail: NTIS CSCL 13/7

The effect of bistable fluidic element chamber geometry on the reattachment distance is analyzed. A formula for estimating this distance is suggested. The distribution of jet velocity downstream the reattachment point is measured with an optical anemometer. GRA

N75-29372# Army Foreign Science and Technology Center, Charlottesville, Va.

FLUIDIC HYDRAULIC ELEMENT WITH HIGH INPUT RESISTANCE

G. G. Molchanov, A. I. Popov, and E. K. Shchepin 6 Apr. 1974 17 p refs Transl. into ENGLISH from proceedings of 4th Conf. on Intern. Fluidics (USSR), 14-18 Oct. 1972 11 p, paper B-11

(AD-A006078; FSTC-HT-23-1641-73; Paper-B-11) Avail:

NTIS CSCL 13/7

An active type fluidic element is discussed, based on an impact modulator incorporating the principle of flow-past-body. This element has high input resistance and high power gain. The amplification cascade transfer function is derived. GRA

N75-29373# Naval Ordnance Lab., White Oak, Md.

RELAXATION BEHIND STRONG SHOCK WAVES Technical Report, Jul. 1972 - Jun. 1974

J. M. Ward 1 Oct. 1974 54 p refs

(ZR0000101)

(AD-A005765; NOLTR-74-182) Avail: NTIS CSCL 07/4

Relaxation phenomena associated with strong shock waves in air were examined in preparation for evaluation of the mechanisms which produce airshock radiant light. A model for the airshock relaxation region is described which considers air chemistry, O2 and N2 vibrational relaxation, and separate electron/atom energy distributions. Results from calculations are compared with experimental data for a Mach number range M = 7 - 36 with very good agreement obtained for the range M = 7 - 20. Comparisons for post-shock equilibrium conditions, ionizational relaxation times, vibrational relaxation times for O2 and N2, and O2 dissociation lengths are included. Author

N75-29374# Massachusetts Inst. of Tech., Cambridge. Fluid Mechanics Lab.

HIGH SPEED REACTING AND RADIATING FLOWS Final Report, 15 Nov. 1970 - 31 Dec. 1974

J. R. Baron Jan. 1975 16 p refs

(Contract F44620-71-C-0009; AF Proj. 9781)

(AD-A006460; AFOSR-75-0382TR) Avail: NTIS CSCL 07/4

Two distinct aspects of energy transfer motivated the research. One was concerned with radiative heat transfer and its coupling with high speed shock layers. Optimum geometric shapes were predicted so as to accomplish a minimization of the overall thermal radiation received by a surface. The highly nonisotropic radiation fields associated with such flows then led to the development of an extended differential approximation model of general applicability. A second area was concerned with some detailed experimental examination of mass transfer related to surface oxidation. Molecular and dissociated oxygen beams were impinged upon graphite targets in studies of the reaction products and probabilities, spatial desorption distributions, and surface relaxation history. The efforts may be of interest to entry flow field analysis, general radiation field evaluations, refractory oxidation, and some aspects of boundary layer, wake, and plume chemical kinetics. GRA

N75-29375# Virginia State Coll., Petersburg. Dept. of Mathematics.

NON-LINEAR EFFECTS OF SURFACE TENSION IN CAVITY FLOW

Krishan M. Agrawal and P. Chaturani Oct. 1974 76 p refs

(Contract N00014-73-A-0441-0001)

(AD-A006036; Rept-74-1-ONR) Avail: NTIS CSCL 20/4

A non-linear analysis has been made to determine the action of surface tension on steady cavity flow. The modified Wu's model is used to represent the flow; conformal mapping and the Riemann-Hilbert technique have been employed to obtain numerical and partial analytic (approximate) solutions. The present study shows how the nature of singularity at leading and trailing edges, with and without surface tension, is different. Mathematically the singularity appears to be of the same kind at both edges. GRA

N75-29376# Purdue Univ., Lafayette, Ind. Project SQUID Headquarters.

TURBULENT MIXING IN NON-REACTIVE AND REACTIVE FLOWS

S. N. B. Murthy, ed. Dec. 1974 453 p refs Workshop held at Lafayette, Ind., 21 May 1974 Sponsored by Navy and AF

(AD-A006322) Avail: NTIS CSCL 20/4

This volume presents the current status of several facets of the problem of turbulent mixing. The papers are the outcome of a workshop type conference on turbulent mixing organized by Project SQUID. A paper (also invited to the workshop) outlining some aspects of the 1974 Southampton Colloquium on Coherent Structures is included. In order to provide a background to the discussions at the meeting, a review was written to examine in some depth the status of the subject and it is presented here as a position paper on turbulent mixing. GRA

N75-29377# Naval Ship Research and Development Center, Bethesda, Md. Performance Dept.

CALCULATION OF NON-LIFTING POTENTIAL FLOW ABOUT ARBITRARY THREE DIMENSIONAL BODIES BASED ON DOUBLET DISTRIBUTIONS Final Report

P. C. Pien Jan. 1975 33 p refs

(SR0230101)

(AD-A005877; SPD-601-01) Avail: NTIS CSCL 20/4

Based upon a surface doublet distribution, a numerical method for computing non-lifting potential flow about an arbitrary three-dimensional body has been developed along with a corresponding computer program. This program has overcome some of the difficulty of the old program developed by Hess and Smith. For the same accuracy, the new program requires a much smaller number of quadrilaterals and thus much less input data preparation. It gives velocity potential directly instead of source density as was the case in the old program. The new program can take the same input data used in the old program or can use a subroutine to generate the input data. The results of a few sample problems are included in the report. GRA

N75-29378# Michigan Univ., Ann Arbor. Dept. of Mechanical Engineering.

THE IMPACT BETWEEN A LIQUID DROP AND AN ELASTIC HALF-SPACE Ph.D. Thesis

Jia-Bo Gilbert Hwang Mar. 1975 208 p refs

(Grant NSF 40130)

(PB-241155/1; UMICH-012449-5-T) Avail: NTIS HC $7.25 CSCL 20D

The high pressure and stress induced during the collision of a liquid drop (or jet) and solid body are responsible for the erosion of steam turbine blades and aircraft components. They can also be used to cut nonmetallic materials and to fracture rocks. The hydrodynamic behavior of the liquid drop and the elastodynamic response of the solid body were computer-simulated. They dynamic equations for a compressible inviscid fluid, neglecting the surface tension and body force, were solved by the modified compressible cell and marker numerical scheme. The dynamic equations for a homogeneous isotropic elastic half-space were solved by a finite difference method. GRA

N75-29379# Bureau of Mines, Pittsburgh, Pa. Mining and Safety Research Center.

NUMERICAL SIMULATION OF FLAME INDUCED AERODYNAMICS IN A COAL-MINE PASSAGEWAY, SEMI-EMPIRICAL MODEL Final Report

Donald N. H. Chi and Henry E. Perlee Feb. 1975 32 p refs

(PB-240843/3; BM-RI-8016) Avail: NTIS HC $3.75 CSCL 08I

A theoretical study is presented of the aerodynamic response of a single-mine entry to flame-induced disturbance. The unsteady, one-dimensional, compressible-flow equations were solved using the method of characteristics. This study was undertaken to determine the feasibility of extending the method-of-characteristic to study the aerodynamic response of complex mine networks. It was demonstrated that although the technique has merit in studying the complex wave interaction in single entries, it appears to be too unwieldly and too expensive for network analysis. Effort was also directed at a further study of the dispersion and filtering characteristic of aerodynamic disturbances in mine passageways. GRA

N75-29993 European Space Research Organization, Paris (France).

CONSERVATION FORMS OF GAS DYNAMIC EQUATIONS

Henri Viviand *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 153-159 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 65-66 (For availability see N75-29988 20-99)

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N75-29380* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CARBON MONOXIDE MONITOR Patent
Robert J. Naumann, inventor (to NASA) Issued 22 Jul. 1975 6 p Filed 6 Nov. 1974 Supersedes N75-10414 (13 - 01, p 0055)
(NASA-Case-MFS-22060-1; US-Patent-3,895,912; US-Patent-Appl-SN-521603; US-Patent-Class-23-255E; US-Patent-Class-23-254E; US-Patent-Class-73-23; US-Patent-Class-311-37; US-Patent-Class-331-65) Avail: US Patent Office CSCL 14B

A device is described for automatic, real time monitoring of carbon monoxide and for providing a continuous read out of the concentration of carbon monoxide. The monitoring device includes two Y-cut, temperature sensitive quartz crystals which are encapsulated in a helium filled can. One of the cans containing a quartz crystal is surrounded by a wire mesh which carries a thin layer of hopcalite coating. The hopcalite is used for oxidizing the carbon monoxide, and the resulting heat of the reaction is detected by the temperature sensitive crystal. Each crystal is driven by a conventional crystal controlled oscillator circuit with a constant frequency bias of a few hundred Hz. The frequencies of the two oscillator circuits are fed into a conventional mixer circuit which beats the frequencies together and produces a single net frequency which is the difference between the two frequencies. The net frequency signal is converted to a dc analog voltage signal which is then fed into a suitable display device.
Official Gazette of the U.S. Patent Office

N75-29381* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
G-LOAD MEASURING AND INDICATOR APPARATUS Patent
James C. Howard, inventor (to NASA) Issued 22 Jul. 1975 11 p Filed 12 Jun. 1974
(NASA-Case-ARC-10806-1; US-Patent-3,895,521; US-Patent-Appl-SN-478802; US-Patent-Class-73-178R) Avail: US Patent Office CSCL 14B

A g-load measuring apparatus for facilitating pilot control of g-load during maneuvering and to provide an indication of g-load constraint violations is proposed. The apparatus includes processing means for receiving the components of the linear acceleration and angular velocity of the aircraft and for generating the first output signal indicative of the critical velocity of the aircraft and a second output signal indicative of the instantaneous maneuvering velocity of the aircraft. Indicating means are connected to the processing means for receiving the two output generated signals such that the relative magnitude of the two signals is compared to provide an indication of the relative freedom of maneuverability of the aircraft and/or any g-load constraint violation that might exist.
Official Gazette of the U.S. Patent Office

N75-29382* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THRUST MEASUREMENT Patent
Robert W. Postma, inventor (to NASA) (Rocketdyne, Canoga Park, Calif.) Issued 2 Apr. 1968 5 p Filed 19 Mar. 1965 Sponsored by NASA
(NASA-Case-XMS-05731; US-Patent-3,375,712; US-Patent-Appl-SN-441279; US-Patent-Class-73-117.4) Avail: US Patent Office CSCL 14B

A rocket engine thrust measuring transducer having an accelerometer coupled to a steady state load sensor is described. The signals from the accelerometer that primarily measure the start and stop load transients and the signals from the load sensor that primarily measure the steady state load transients are summed to constitute a signal that is indicative of thrust measurement. Official Gazette of the U.S. Patent Office

N75-29383*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND APPARATUS FOR BACKGROUND SIGNAL REDUCTION IN OPTO-ACOUSTIC ABSORPTION MEASUREMENT Patent Application
Lars-Goran Rosengren, inventor (to NASA) (JPL) Filed 25 Jul. 1975 11 p
(Contract NAS7-100)
(NASA-Case-NPO-13683-1; US-Patent-Appl-SN-599284) Avail: NTIS HC $3.25 CSCL 14B

A procedure is reported for increasing the sensitivity of an opto-acoustic absorption detector in order to measure trace amounts of constituent gases in a sample. The procedure involves creating a second beam radiation path through the sample cell identical to a first beam except for the length, alternating the beam through the two paths, and minimizing the detected pressure difference for the two paths while the beam wavelength is tuned away from the absorption lines of the sample. Then with the beam wavelength tuned to the absorption line of any constituent of interest, the pressure difference is a measure of trace amounts of the constituent. The same detector may also be used for measuring the absorption coefficient of known concentrations of absorbing gases. NASA

N75-29384*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A HOT-WIRE SURFACE GAGE FOR SKIN FRICTION AND SEPARATION DETECTION MEASUREMENTS
Morris W. Rubesin, Arthur F. Okuno, George G. Mateer, and Aviel Brosh Jul. 1975 12 p refs
(NASA-TM-X-62465; A-6159) Avail: NTIS HC $3.25 CSCL 14B

A heated-element, skin-friction gage employing a very low thermal conductivity support is described. It is shown that the effective dimension of the gage in the stream direction in only 0.06 mm, including the effects of heat conduction in the supporting material. Because of its small size, the calibration of the gage is independent of the kind of boundary-layer flow (whether laminar or turbulent) and is insensitive to pressure gradients. Construction tolerances can be maintained so that a single universal calibration can be applied. Multiple gages, sufficiently closely spaced so as to interfere with each other, are shown to provide accurate determinations of the locations of the points of boundary-layer separation and reattachment. Author

N75-29385*# Transemantics, Inc., Washington, D.C.
INVESTIGATION OF RADIOMETERS. 4. EXPERIMENTAL CONTRIBUTIONS TO THE EXAMINATION OF THE THEORIES OF THE COMMON SINGLE-PLATE RADIOMETER
W. Gerlach and W. Schuetz Washington NASA Aug. 1975 22 p refs Transl. into ENGLISH from Z. Phys. (West Germany), v. 78, 1932 p 43-58
(Contract NASw-2792)
(NASA-TT-F-16480) Avail: NTIS HC $3.25 CSCL 14B

Thermal measurements and a flow manometer were used to prove thermal slipping flow in both surfaces of a common single plate radiometer in air and hydrogen. Results show an approximate confirmation of Epstein's radiometer theory. In hydrogen the observed power is greater than that given by the theory; reasons for the deviation are included. Author

N75-29386*# Pennsylvania Univ., Philadelphia. Dept. of Biology.
LIMITATION ON THE USE OF THE HORIZONTAL CLINOSTAT AS A GRAVITY COMPENSATOR
A. H. Brown, A. O. Dahl, and D. K. Chapman 22 Aug. 1975 21 p refs
(Contracts NAS2-2432; NAS2-7730; NASw-2208; NASw-2232; Grants NGR-39-010-104; NGR-39-010-149; NGR-39-030-010)
(NASA-CR-143288; NULTST-1) Avail: NTIS HC $3.25 CSCL 14B

If the horizontal clinostat effectively compensates for the influence of the gravity vector on the rotating plant, it makes the plant unresponsive to whatever chronic acceleration may be

applied transverse to the axis of clinostat rotation. This was tested by centrifuging plants while they were growing on clinostats. For a number of morphological endpoints of development, the results depended on the magnitude of the applied g-force. Gravity compensation by the clinostat was incomplete, and this conclusion is in agreement with results of satellite experiments which are reviewed. Author

N75-29387*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SKYLAB PROGRAM PAYLOAD INTEGRATION. SKYLAB FILM ENVIRONMENTAL EFFECTS
Jul. 1975 290 p refs Prepared by Martin Marietta Corp., Denver, Colo.
(Contract NAS8-24000)
(NASA-TM-X-64951; ED-2002-1777) Avail: NTIS HC $8.75 CSCL 14E

The effects of the Skylab environments on the 22 types of film used for data recording on Skylab were evaluated. Environmental histories and sensitometric curves for 114 rolls of film used for this evaluation are presented. Photographic parameters evaluated in detail were film fogging of black and white films, changes in maximum density of color film, latent image fading, and changes in film sensitivity. Other photographic and film physical anomalies such as electrostatic exposure, emulsion cracking, and reciprocity failure were also documented. Results based upon comparison of film sensitometric data for flight film with ground control film and ground test film are presented independently for each film type. The study showed that photographic film fulfilled the requirements of the Skylab applications in which it was used. Environmental film degradation, although present on almost every roll, did not preclude recording sufficient data to meet experiment requirements for all film, except film type SC-5. Specific conclusions are provided in the areas of further analyses, tests, and developments. Author

N75-29388*# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
A STUDY TO ANALYZE SIX BAND MULTISPECTRAL IMAGES AND FABRICATE A FOURIER TRANSFORM DETECTOR Final Report, 21 Dec. 1973 - 21 Jun. 1975
R. G. Shackelford and J. R. Walsh, Jr. 21 Jun. 1975 87 p refs
(Contract NAS8-30534; Proj. A-1592)
(NASA-CR-120684) Avail: NTIS HC $4.75 CSCL 14B

An automatic Fourier transform diffraction pattern sampling system, used to investigate techniques for forestry classification of six band multispectral aerial photography is presented. Photographs and diagrams of the design, development and fabrication of a hybrid optical-digital Fourier transform detector are shown. The detector was designed around a concentric ring fiber optic array. This array was formed from many optical fibers which were sorted into concentric rings about a single fiber. All the fibers in each ring were collected into a bundle and terminated into a single photodetector. An optical/digital interface unit consisting of a high level multiplexer, and an analog-to-digital amplifier was also constructed and is described. Author

N75-29389*# State Univ. of New York, Albany. Computing Center.
IMAGE PROCESSING AND DATA REDUCTION OF APOLLO LOW LIGHT LEVEL PHOTOGRAPHS Technical Report, 29 Jul. - 31 Dec. 1974
Gregory C. Alvord Dec. 1975 37 p
(Contract NAS5-20683)
(NASA-CR-144659) Avail: NTIS HC $3.75 CSCL 14E

The removal of the lens induced vignetting from a selected sample of the Apollo low light level photographs is discussed. The methods used were developed earlier. A study of the effect of noise on vignetting removal and the comparability of the Apollo 35mm Nikon lens vignetting was also undertaken. The vignetting removal was successful to about 10% photometry, and noise has a severe effect on the useful photometric output data. Separate vignetting functions must be used for different flights since the vignetting function varies from camera to camera in size and shape. Author

N75-29390# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
A THIN FILM CATALYTIC-NON-CATALYTIC HEAT TRANSFER GAUGE FOR SHOCK TUBE MEASUREMENTS IN REACTING GASES
B. J. McCaffrey, R. A. East, and M. W. Stent [1975] 46 p refs
(AASU-336) Avail: NTIS HC $3.75

Design, construction and calibration are described of a thin film differential, catalytic/noncatalytic gage used to measure the chemically reactive contribution to heat transfer in high enthalpy, short duration flows. The preparation for the subsequent vacuum evaporation of the nickel films, the insulating silicon monoxide coatings, and the metallic catalytic coatings are described, together with the techniques developed for calibration of the appropriate thermal properties of the gages. Typical calibration results are quoted. Author (ESRO)

N75-29391# Royal Aircraft Establishment, Farnborough (England).
DETERMINING THE TRAJECTORIES OF MULTIPLE OBJECTS USING STEREOPHOTOGRAPHY AND PHOTOGRAMMETRY
D. F. Woolcott Aug. 1974 26 p
(RAE-TM-IR-148; BR43991) Avail: NTIS HC $3.75

A specific requirement to produce individual trajectory data for each of a cluster of parachutists dropped from an aircraft was studied. Stereophotography with wide angle lenses was used to differentiate the objects prior to measurement of their positions from the photographic images. Recording the instant of taking each stereophotographic pair against time enabled trajectories and velocities to be obtained, a cross check being obtained from kinetheodolite recordings of the positions of some of the objects. Although absolute positional errors of up to 41 meters were experienced the rms of the residual error after trends were removed was 0.5 meter. The photogrammetric equations used are discussed in the annex. Author (ESRO)

N75-29392# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
TESTS ON PROBES DESIGNED TO MEASURE STAGNATION PRESSURE DIRECTLY IN A SUPERSONIC STREAM
A. R. G. Mundell London Aeron. Res. Council 1974 34 p refs Supersedes RAE-TR-73123; ARC-35091
(ARC-R/M-3755; RAE-TR-73123; ARC-35091) Avail: NTIS HC $3.75; HMSO £1.80; PHI $7.20

The geometry of a probe capable of measuring stagnation pressure directly in a supersonic flow by means of an isentropic compression is given. Tests show that such a probe can indicate the local stagnation pressure to within 0.1 per cent for Mach numbers up to 2.2. Above M = 2.2 the pressure recovery begins to fall from unity and precalibration becomes necessary. Pressure recovery for a sensing tube mounted on our infinite straight swept cylinder was also discussed. Author

N75-29393# Army Foreign Science and Technology Center, Charlottesville, Va.
APPLICATION OF THE HELICOPTER KA-26 TO LARGE-SCALE AERIAL PHOTOGRAPHY
A. G. Vanin and A. Yu. Tankus 23 Jan. 1974 11 p Transl. into ENGLISH from Geodeziya i Kartografiya (USSR), no. 6, 1972 p 35-40
(AD-A005950; FSTC-HT-23-0826-73) Avail: NTIS CSCL 14/5

The KA-26 helicopter and its use in large-scale aerial photography is described. Weight, camera characteristics, photographic speeds and area limitations are discussed in detail. GRA

N75-29394# Army Foreign Science and Technology Center, Charlottesville, Va.
MASS-PRODUCTION MODEL OF AUTOMATIC RDV-1 PHOTOMETER FOR MEASURING AND RECORDING ATMOSPHERIC TRANSPARENCY
V. I. Goryshin 8 Nov. 1974 13 p refs Transl. into ENGLISH from Tr. Gl. Geofiz. Observ. (Leningrad), no. 213, 1968
(AD-A006076; FSTC-HT-23-1062-72) Avail: NTIS CSCL 04/1

The testing of an automatic photometer prototype is discussed along with instrument reliability and accuracy. Operating principles and systems of the instrument were also treated. E.H.W.

N75-29395# Block Engineering, Inc., Cambridge, Mass.
FIREBIRD INTERFEROMETER Final Report, Jul. 1972 - Dec. 1974
Paul G. J. Morse Jan. 1975 55 p
(Contracts F33615-72-C-2142; F33615-71-C-1074; ARPA Order 2116; AF Proj. 7660)
(AD-A005815; AFAL-TR-340) Avail: NTIS CSCL 20/6

The purpose of this program was the development of a reduced background infrared spectrometer to be installed on board a U-2 aircraft. It was expected that data obtained from the system would help resolve questions concerning long wavelength infrared plume emission mechanisms and specific radiating species in the 5 - 14 micrometer region. In addition to the spectrometer, the program required the development of a ground based data processing system for on-site quick look analysis of the data returned from the airborne spectrometer. The spectrometer designed and constructed under this program consisted of a rapid scanning, high spectral resolution Michelson interferometer operating at liquid nitrogen temperatures. The remaining support subsystems, including, the data processing system, the two axis stabilized gimbal tracking system, the airborne liquid nitrogen supply reservoir, and the interferometer control electronics were successfully completed. GRA

N75-29396# Naval Postgraduate School, Monterey, Calif.
AN EVALUATION OF MAGNETIC MOUNTING OF ACCELEROMETERS M.S. Thesis
Donald Vernon Colley Dec. 1974 44 p refs
(AD-A005735) Avail: NTIS CSCL 14/2

The performance of magnetic clamps as a means of attaching accelerometers for machinery vibration surveys is investigated. Three conditions that might adversely affect magnetic clamp effectiveness are looked at in detail: (1) the presence of cross-motion, (2) the mounting conditions, and (3) the presence of high levels of acceleration. Results are given for six commercially produced magnetic clamps. Cross-motion and high acceleration are found to have little effect on magnetic clamp response to the extent tested. Improper mounting is found to affect response greatly. Procedures are recommended for attachment of clamps and results of tests using these procedures are shown to be reproducible. GRA

N75-29397# School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
REMOVING TRACE CONTAMINANTS FROM SAMPLING CYLINDERS Final Report, Mar. - Aug. 1974
Paul L. Martin Feb. 1975 15 p
(AF Proj. 7164)
(AD-A006138; SAM-TR-75-4) Avail: NTIS CSCL 14/2

Three methods for removing trace contaminants from stainless-steel sampling cylinders were evaluated: evacuation, helium flushing, and steam flushing. Background and postcleaning concentrations were ascertained by gas chromatographic analyses for four hydrocarbons. From these data, washout curves were generated showing that steam flushing was the most effective method for the worst-case conditions. GRA

N75-29398# Rosenstiel School of Marine and Atmospheric Sciences, Miami, Fla.
SINGLE-WING CURRENT METER HOUSING
Shale Niskin Feb. 1975 7 p ref
(Contract N00014-67-A-0201-0013)
(AD-A006281; UM-RSMAS-75006) Avail: NTIS CSCL 08/3

The inclining-wand type current meter was designed as an approach to meet requirements for a reliable, accurate, and inexpensive instrument, but could provide only a single recording. A new housing design incorporates a film-data logger for long time series; it is fitted with a single large vane for stability. The single-wing housing is useful for most oceanographic current studies. GRA

N75-29399# Naval Ship Research and Development Center, Bethesda, Md.
ANALYSIS OF PLASTIC MODELS OF SHIP STRUCTURES USING HOLOGRAPH AND STRAIN GAGES
Herbert A. Peterson and Jerome P. Sikora Feb. 1975 30 p refs
(SF43422703)
(AD-A006269; NSRDC-4517) Avail: NTIS CSCL 13/10

Displacement, stress, and vibration analyses were made on a one-sixteenth scale model of a destroyer. The feasibility of using thin walled plastic models for holographic displacement and vibration analyses was investigated. Strain gages were used to investigate deckhouse effectiveness and determine main deck and deckhouse strains for comparison with holographic results. Main deck strain gages showed that the addition of a deckhouse reduced main deck strains and the insertion of an expansion joint near amidships in the deckhouse caused the main deck strains to increase to a value significantly lower than if no deckhouse were present. The local plate vibrations were also analyzed. GRA

N75-29400# Naval Postgraduate School, Monterey, Calif.
AN APPLICATION OF HOLOGRAPHIC INTERFEROMETRY TO GUN BARREL EROSION M.S. Thesis
Richard J. Naughton Dec. 1974 65 p refs
(AD-A005867) Avail: NTIS CSCL 19/6

Real time holographic interferometry has recently been applied to many engineering areas. This study presents the development and investigation of a technique to predict gun barrel wear by examining the barrel erosion through the use of real time holographic interferometry. It was determined that the proposed technique was probably not feasible due to the extreme sensitivity of real time holography to any change in surface microstructures and due to the difficulty of precise relocation of the object. During investigation of the proposed technique, holographic data addressing the problem of general translation of an object was acquired and is also reported. GRA

N75-29401# Dugway Proving Ground, Utah.
AERIAL SPRAY EVALUATION PINE BUTTERFLY TEST, BITTERROOT NATIONAL FOREST, MONTANA, 1973
John W. Barry, Gary L. Sutton, Bruce S. Grim, Robert B. Ekblad, and William M. Ciesla Jan. 1975 210 p refs
(AD-A006256; DPG-DR-C620A) Avail: NTIS CSCL 06/6

The U.S. Department of Agriculture, Forest Service, conducted a pilot test in the Bitterroot National Forest, Montana, during June 1973, supported by the U.S. Army Dugway Proving Ground, Dugway, Utah. The pilot test consisted of helicopter spraying twelve 40-acre plots. Each plot had a high population level of pine butterfly (Neophasia menapia), a defoliator of the ponderosa pine. Six plots were sprayed with the insecticide Zectran and six with the microorganism, Bacillus thuringiensis. U.S. Army support included meteorological forecasting, meteorological monitoring at each plot, spray deposition sampling, deposition sampler assessment, pretest prediction modeling of spray behavior, and tracking during helicopter swathing. The report presents results and recommendations on recoveries of spray droplets, spray penetration plots of the forest canopy and discussions on droplet behavior. GRA

N75-29402# Honeywell Radiation Center, Lexington, Mass.
SILICON STAR SENSOR Final Report, 1 Aug. 1972 - 30 Sep. 1973
R. F. Greenwood and W. H. Mueffelmann 20 Nov. 1974 219 p refs
(Contract F04701-72-C-0435)
(AD-A006482; SAMSO-TR-74-153) Avail: NTIS CSCL 22/2

The goal of the development was to design, fabricate, and test a silicon star sensor. The initial task was a systems study followed by a detailed design and fabrication. The fabricated Design Verification Model was tested in various ways. The end design is a highly versatile silicon star sensor. It is possible to modify the sensor to perform on a wide variety of missions by changing the slit width and the time constants and threshold levels in the electronics. The basic mechanical design need not be touched and, hence, requalification of the sensor is not necessary. GRA

N75-29403# National Environmental Research Center, Cincinnati, Ohio. Methods Development and Quality Assurance Research Lab.

INTERFACING A 24-POINT ANALOG RECORDER TO A COMPUTER CONTROLLED TELEMETRY LINE
John M. Teuschler Feb. 1975 33 p
(PB-241086/8; EPA-670/4-75-002) Avail: NTIS HC $3.75
CSCL 09F

Interface circuitry was designed so that telemetered data originating from various remote stations could be recorded by both a digital computer and an analog recorder. The entire interface circuitry is mounted on a 3-1/2 x 2-1/2 inch printed circuit card and installed in the receiver. Data from the two methods of collection can be collected and a comparison can be made. A switching network also permits computer control with computer and recorder logging, or computer logging only, or recorder logging only. GRA

N75-29404# National Bureau of Standards, Boulder, Colo. Electromagnetics Div.
GENERATION OF STANDARD EM FIELDS FOR CALIBRATION OF POWER DENSITY METERS 20 kHz TO 1000 MHz Final Report
M. L. Crawford Jan. 1975 45 p refs Sponsored by Army, Navy, and AF
(COM-75-10395/2; NBSIR-75-804) Avail: NTIS HC $3.75
CSCL 14B

The report describes techniques for calibrating power density meters used by the Department of Defense in measuring high intensity (hazard level) RF fields in the frequency range 20 kHz to 1000 MHz. Several techniques were considered for producting a standard field including parallel plate and parallel wire transmission lines, transverse electromagnetic mode (TEM) transmission cells, various directive antennas, and open ended waveguide (OEG). The major emphasis is on the TEM cells, which are recommended for the frequency range 20 kHz to 500 MHz. Design and evaluation details and an error analysis are discussed. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N75-29405 British Library Lending Div., Boston Spa (England).
LIGHT CONVERSION IN DYE LASERS
Ju. V. Nabojkin, V. G. Tiscenko, L. S. Ogurcova, A. P. Podgornyj, and F. S. Pokrovskaja [1974] 5 p refs Transl. into ENGLISH from Ukr. Fiz. Zh. (Kiev), v. 17, 1972 p 1205-1207
(BLL-M-23559-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 1 BLL photocopy coupon

The effect of the transformation of an alcohol solution of 1.5 diphenyl-3-styrylpyrasolin on the energy parameters of a 6G rhodamine laser is investigated. Results are discussed. Author

N75-29406# Defence Research Establishment Valcartier (Quebec). Research and Development Branch.
PRELIMINARY ANALYSIS OF A LIGHT-GAS GUN-DRIVEN GAS DYNAMIC LASER
G. Fournier and J. P. Morency May 1975 64 p refs
(DREV-4011/75) Avail: NTIS HC $4.25

One of DREV's light-gas guns could be modified for use as a driver for a CO2 gas dynamic laser. The basic concept consists of adding an appropriate nozzle and an expansion section to the pump-tube end of the gas gun. By properly adjusting the various gas gun parameters, a pre-selected gas mixture (He-CO2-N2) or (H2O-CO2-N2) is discharged at constant velocity into the cavity where lasing action will occur when the excited N2 transfers some of its energy to CO2 to produce a population inversion. A discussion of the gas gun modification is given, and an appropriate theoretical model is established. On the basis of present results some conclusions are drawn as to the possibility of scaling the device and its use, in conjunction with a TEA-CO2 laser, as a final stage amplifier in the production of a high energy pulse. Conservative estimates indicate that with the DREV 10-cm, 5-m-long pump-tube, power in the megawatt range could be obtained. The same device used as a final stage amplifier could possibly produce energies of the order of 1 kJ. Author

N75-29407*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
PARTICULATE CONTAMINATION SPECTROMETER. VOLUME 1: TECHNICAL REPORT Final Report, Jul. 1974 - Mar. 1975
R. J. Schmitt, B. A. Boyd, and R. M. F. Linford May 1975 86 p refs
(Contract NAS9-14171)
(NASA-CR-144375; MDC-E1249-Vol-1) Avail: NTIS HC $4.75 CSCL 20E

A laser particulate spectrometer (LPS) system was developed to measure the size and speed distributions of particulate (dusts, aerosols, ice particles, etc.) contaminants. Detection of the particulates was achieved by means of light scattering and extinction effects using a single laser beam to cover a size range of 0.8 to 275 microns diameter and a speed range of 0.2 to 20 meter/second. The LPS system was designed to operate in the high vacuum environment of a space simulation chamber with cold shroud temperatures ranging from 77 to 300 K. Author

N75-29408# Tokyo Univ. (Japan).
A NUMERICAL STUDY ON THE EFFECTS OF VISCOSITY ON THE PERFORMANCE OF CO2 GASDYNAMIC LASER
Ryuma Kawamura and Wataru Masuda Jun. 1975 40 p refs Repr. from Inst. of Space and Aeron. Sci., Univ. of Tokyo, Rept. 528 (Tokyo), v. 40, no. 8, Jun. 1975 p 205-244
(ISAS-528-Vol-40-No-8) Avail: NTIS HC $3.75

The effects of viscosity on the performance of CO2 gasdynamic laser were studied numerically using the laminar boundary layer model and turbulent wake model. A finite-difference method was developed for the solution of the vibrational nonequilibrium boundary layer equations. To avoid the numerical instability associated with the very fast relaxation rates, production terms in the differential equations were linearized about an appropriate initial guess to the solutions, and an implicit finite-difference scheme of Crank-Nicolson type was used to solve the resulting equations. Solutions were obtained by successively solving the equations in sequence until the original differential equations, in which the production terms are expressed as nonlinear, are satisfied within the desired accuracy. The effects of the nozzle wall conditions, specifically the wall temperature and catalysis, reservoir conditions and the throat Reynolds number on the performance of CO2 gasdynamic laser were studied. The numerical results show that the viscosity is an important parameter for determining the optimum nozzle size and that one should operate CO2 gasdynamic lasers with uniformly cooled wall condition. Author

N75-29409# Instituto de Investigaciones Cientificas y Tecnicas de las Fuerzas Armadas (CITEFA), Buenos Aires (Argentina).
FUNDAMENTALS OF HOLOGRAPHIC INTERFEROMETRY
J. E. Toni, R. Jimenez Rebagliati, G. DaCosta, and J. M. Astigueta Jun. 1975 36 p refs In SPANISH; ENGLISH summary
(Rept-182) Avail: NTIS HC $3.75

Double exposure, real time, reference beams, and time averaging in holographic interferometry are described theoretically and experimentally. Fringe interpretation of transparent and opaque objects is discussed along with localization of fringes. Associated techniques, such as dual-hologram interferometry and combinations with differential shearing interferometry, are reviewed. A summary of applications is included. Author

N75-29410*# Old Dominion Systems, Inc., Gaithersburg, Md.
CO2 LASER RANGING SYSTEMS STUDY Final Report
Cesar A. Filippi May 1975 23 p
(Contract NAS5-20655)
(NASA-CR-144655) Avail: NTIS HC $3.25 CSCL 20E

The conceptual design and error performance of a CO2 laser ranging system are analyzed. Ranging signal and subsystem processing alternatives are identified, and their comprehensive evaluation yields preferred candidate solutions which are analyzed to derive range and range rate error contributions. The performance results are presented in the form of extensive tables and figures which identify the ranging accuracy compromises as a function of the key system design parameters and subsystem performance indexes. The ranging errors obtained are noted to

be within the high accuracy requirements of existing NASA/GSFC missions with a proper system design. Author

N75-29411# Defence Research Establishment Valcartier (Quebec).
GIGAWATT CO2 LASER FOR LASER-TARGET INTERACTION STUDIES
F. Rheault, J. L. Lachambre, P. Lavigne, H. Pepin, and H. A. Baldis (Quebec Univ.) May 1975 16 p refs
(DREV-R-4017/75; CRDV-4017/75) Avail: NTIS HC $3.25

A CO2 oscillator-amplifier laser system generating short pulses of radiation in the gigawatt range is described. Emphasis is laid upon self-oscillation problems associated with high gain amplifier chain. The insertion of SF6, Freon and C2H5OH cells between the amplifier modules is found efficient in suppressing any oscillation in the presence of a polyethylene target. The characteristics of the output radiation are given together with the reflection measurements of the target during the interaction with the laser pulse. Author

N75-29412# Defence Research Establishment Valcartier (Quebec).
PASSIVE MODE-LOCKING OF A LARGE VOLUME TEA-CO2 LASER USING AN UNSTABLE RESONATOR CONFIGURATION
P. Lavigne, J. Gilbert, and J. L. Lachambre Feb. 1975 14 p refs
(DREV-R-4016/75; CRDV-4016/75) Avail: NTIS HC $3.25

An experimental investigation was made of the passive mode-locking of a UV-preionized CO2 laser operating in an unstable wavelength-selective resonator using SF6, BCL3 and N2F4 as bleachable gases. Stable repetitive pulse trains with individual pulses having energies as high as 2 J at 2 ns duration were obtained on a large number of P and R transitions of the 00 degree 1-10 degree 0 band at 10.6 microns. Use of the selectively absorbing gas C2H5OH in the resonator enabled the production of clean, mode-locked pulses by the saturation of N2F4 without the need of an optical dispersive element. Author

N75-29413# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
SHORT-TERM SPOT SIZE AND BEAM WANDER IN A TURBULENT MEDIUM Physical Sciences Research Paper
Ronald L. Fante and Richard L. Taylor 27 Nov. 1974 13 p
(AF Proj. 2153)
(AD-A006032; AFCRL-PSRP-616; AFCRL-TR-74-0595) Avail: NTIS CSCL 20/6

The authors have calculated the short-term beam spread and beam wander of a laser beam propagating in a turbulent medium. These results have been used to calculate the probability that, due to beam wander, the beam will fail to hit a receiver aperture. GRA

N75-29414# Battelle Pacific Northwest Labs., Richland, Wash.
INVESTIGATE MATERIAL SYSTEMS FOR A MIRRORS USED IN HIGH POWER CO AND CO2 LASERS Final Report
R. W. Stewart Nov. 1974 80 p refs
(Contract N00123-72-C-2215; ARPA Order 2175)
(AD-A006101) Avail: NTIS CSCL 20/5

This report is aimed at demonstrating the viability of a mirror structure concept formed by sputter deposited materials. The mirror concept would be used in high energy CO, CO2, and other infrared laser systems at the infrared wave length of 10.6 micrometers. Sputtered deposits of Cu-1 vol% SiC on a variety of metal substrates provided surfaces that could be reproducibly polished using conventional techniques to an rms roughness of 20 A or less. Sputter-deposited germanium and CdTe were found to have optical properties near those of bulk material. Sputter deposition of quarter-wavelength reflectivity enhancement coatings therefore appears feasible. The results of limited laser damage testing were exceptional considering that there was not time to optimize material properties. GRA

N75-29415# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
PARAMETRIC INVESTIGATION OF THE Na-N2O + CO CHEMICAL LASER
R. C. Benson, C. B. Bargeron, and R. E. Walker Oct. 1974 32 p
(Contract N00017-72-C-4401)
(AD-A006117; APL-TG-1266) Avail: NTIS CSCL 20/5

An investigation has been performed on the Na-catalyzed N2O+CO chemical laser. Although the results indicate that at least six chemical reactions are involved, the simple chain reaction, which apparently leads to lasing action, is Na + N2O to N2 + NaO + 21.0 kcal/mole and NaO + CO to CO2 + Na + 66.2 kcal/mole. Measurements were made in the transverse-flow configuration. Gain measurements have been made along the reaction length as a function of the CO/N2O ratio, combustion efficiency, and pressure. Several aspects of the chemical reactions have been studied. Several possible reactions are discussed. GRA

N75-29416# Hughes Research Labs., Malibu, Calif.
WAVEGUIDE GAS LASER Final Report, 1 Dec. 1973 - 30 Nov. 1974
Marvin B. Klein Dec. 1974 58 p refs
(Contract F19628-74-C-0096; AF Proj. 2001)
(AD-A006410; AFCRL-TR-75-0005) Avail: NTIS CSCL 20/5

The objectives of this program are to study (both analytically and experimentally) gas laser systems which might operate advantageously in a waveguide configuration. In this analysis phase the authors examined the scaling of known gas discharge laser systems with diameter. Interest was in studying performance characteristics which might be improved in small bore discharges. Three systems were identified as being particularly promising: the HF electrical laser, the xenon excimer laser, and the argon-nitrogen transfer laser. In the case of the HF electrical laser, the particular advantage of small bore discharge operation is the control of E/P and the minimizing of discharge nonuniformity and instabilities. Pulsed discharges were operated in HF-argon mixtures at conditions which duplicate those used in successful laser experiments using electron beam stabilized discharges. Analysis of the xenon excimer laser and the argon-nitrogen transfer laser indicates that the high specific pump power required could be produced in small bore discharges. GRA

N75-29417# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Schools of Systems and Logistics.
A GASP 4 SIMULATION OF TACTICAL AIR INTERDICTION USING A CHOICE OF WEAPONS LOADS AND CONTINUOUSLY CHANGING WEATHER CONDITIONS M.S. Thesis
Ronald G. Bailey and Joseph R. Szwarc Jan. 1975 165 p refs
(AD-A006349; SLSR-20-75A) Avail: NTIS CSCL 15/7

The thesis simulates tactical air strike missions with a choice between unguided and laser-guided weapons. Weather at target point is known at a time prior to strike aircraft arrival. The simulation has a choice of three load decision rules: always load conventional, always load guided, or load aircraft with unguided versus guided bombs based on probability tables, using Markov chain principles, to estimate weather over target at n hours. Weather probability tables will dictate type of munition loaded. The actual weather at target is simulated using GASP IV, a computer language which allows continuous event simulation. GASP IV is used to simulate weather fronts moving toward target(s). The speed and distance between fronts is based on historical weather data. GASP IV changes the weather conditions at the target as a front moves over it. Strike results are based on actual weather, type of bomb loads, and the air defense at target. GRA

N75-29418# Rockwell International Corp., Canoga Park, Calif.
FINE ORIFICE INJECTOR DEVELOPMENT Final Report, 27 Dec. 1972 - 15 Nov. 1974
J. J. Vieceli Nov. 1974 215 p
(Contract DAAH01-73-C-0408)
(AD-A006204; R9616; RK-CR-75-22) Avail: NTIS CSCL 20/5

The operating characteristics of a supersonic mixing transfer chemical laser (TCL) have been experimentally determined. The performance of the TCL has been determined for a wide range of operating conditions using a fixed supersonic mixing chemical laser nozzle bank. The important parameters are: nozzle

configuration; nozzle exit conditions; (exit pressure and exit temperature); composition (fluorine available for lasing, fracture of fluorine dissociated, He molar flow ratio, laser fuel flow ratio, and CO2 molar flow ratio); cavity flow conditions (cavity pressure); and resonator parameters. Most of the experimental effort reported was devoted to the DF-CO2 TCL. GRA

N75-29419# Naval Postgraduate School, Monterey, Calif.
A HETERODYNE DETECTION FM-CW LASER RADAR USING A 10 MICROMETERS SOURCE M.S. Thesis
Maurice F. Fraunfelder, Jr. Dec. 1974 113 p refs
(AD-A005865) Avail: NTIS CSCL 17/5

The feasibility of a heterodyne detection FM-CW laser radar capable of providing simultaneous range and velocity information was investigated. Linear triangular frequency modulation was accomplished with an acoustooptic modulator. Two separate optical configurations were investigated. Ranges to 2400 plus or minus 30 yards were measured using a two-inch retro-reflector as a target, with a 7000-yard maximum predicted range. Velocities as low as .37 m/sec were easily measured, and the system was estimated to have a velocity resolution of approximately .05 m/sec. The measured receiver sensitivity was approximately 30 db below the theoretical limit. An unexplained zero velocity return was observed from a moving target with the second optical configuration. A signal contamination of the local oscillator beam was also observed. GRA

N75-29420# General Electric Co., Philadelphia, Pa. Space Div.
INVESTIGATION OF HIGH POWER MHD GAS LASERS
Bert Zauderer, Eric Tate, and C. H. Marston Jan. 1975 20 p refs
(Contract N00014-74-C-0243; ARPA Order 2252)
(AD-A006298) Avail: NTIS CSCL 20/5

This report presents the results obtained during the second half of the year 1974 in the study of MHD powered gas lasers. Key results of the work thus far are: (1) changes to the shock tunnel and test facility include a modified cesium seed injection system, relocation of the secondary diaphragm, installation of a primary double diaphragm and a new CO2 probe laser; (2) gain measurements previously reported have been repeated, with substantial improvement in the signal attributable to the above changes; (3) achievement of 19% enthalpy extraction in the MHD generator channel is an important step forward in generator performance. GRA

N75-29421# Army Foreign Science and Technology Center, Charlottesville, Va.
OPTICAL-BAND ANTENNAS
Yu. V. Tyzhnov and G. Kh. Fridman 26 Jun. 1974 24 p refs Transl. into ENGLISH of mono. "Sovremennye Problemy Antenno-Volnovodnoi Tekhniki" Moscow, 1967 p 189-201
(AD-A005966; FSTC-HT-23-883-74) Avail: NTIS CSCL 20/5

The laser as part of an antenna system is discussed. Transmitting and receiver antennas are discussed separately. A special discussion of the control of ultranarrow beams is presented. GRA

N75-29422# Naval Research Lab., Washington, D.C.
RADIATION TRANSPORT IN AXISYMMETRIC GEOMETRIES
D. G. Colombant and N. K. Winsor Feb. 1975 20 p refs
(NRL Proj. H02-30; DNA Proj. NWED-PF-001)
(AD-A006252; NRL-MR-2984) Avail: NTIS CSCL 20/13

The Multi-direction radiation sweep algorithm described previously for a Cartesian coordinate system, has been extended to more general geometries. The authors report here tests in cylindrical geometry of this generalized MDRS algorithm. The algorithm is used for the radial integration of the transport equation only. This solution is compared to the solution of the complete transport problem in a circular cross-section and it is found that the validity of this approximation increases with the opacity of the medium. For the case of thin media, weighting functions are suggested for improving the approximation. GRA

N75-29423# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DEVELOPMENT OF TUNABLE SEMICONDUCTOR LASERS FOR APPLICATION TO AIR POLLUTION MEASUREMENTS Final Report
A. Mooradian, A. S. Pine, and R. W. Ralston Jan. 1974 129 p refs
(Grant NSF GI-34990)
(PB-241030/6; NSF/RANN/IT/GI-34990/PR-74-5; NSF/RA/E-74-036) Avail: NTIS HC $5.75 CSCL 20E

This report summarizes progress made in developing tunable semiconductor lasers for application to air pollution monitoring. The researchers report achieving broad tunability in the near- and mid-infrared with Doppler-limited spectral resolution using pressure-tuned GaAs and PbSSe diodes at 77K. A stable and compact pressure tuning system was developed and used in the experiments that were conducted researchers found that operation of a GaAs diode laser in an external cavity with a grating can provide significant improvement over other common laser cavity configurations. GRA

N75-29424# Rensselaer Polytechnic Inst., Troy, N.Y.
PROBLEMS OF THE GAMMA RAY LASER Report, 1 May 1973 - 1 Jun. 1974
George C. Baldwin Aug. 1974 147 p refs
(Grant DA-ARO(D)-31-124-73-G162; DA Proj. 1T1-61102-B-11A)
(AD-A006197; BRL-CR-179) Avail: NTIS CSCL 20/5

This report is addressed to the problem of the state-of-the-art of gamma ray laser development. It is intended to identify the various disciplines and specific research areas which can best contribute to resolving the question of graser feasibility. Topics discussed include the following: the basic mechanisms of laser action; gamma ray emission from nuclear isomers; the resonance cross section; nonresonant absorption; photon kinetics; inhomogeneous line breadths; problems of pumping. GRA

N75-29425# ARO, Inc., Arnold Air Force Station, Tenn.
INTERFEROMETRIC INSTRUMENTATION FOR PARTICLE SIZE ANALYSIS Final Report, Jul. 1972 - Jul. 1973
D. W. Roberds, W. M. Farmer, and A. E. Lennert AEDC Feb. 1975 59 p refs
(AD-A006136; ARO-OMD-TR-74-41; AEDC-TR-74-82) Avail: NTIS CSCL 14/2

This report summarizes the results of a research program conducted to determine the characteristics and potential capabilities of particle size analysis using laser interferometer techniques. Theoretical and experimental analyses are reported which indicate that a range of particle sizes from submicron to millimeters in diameter can be determined when the cross-sectional shape of the particle is known. It is shown that number density can be determined from the interferometric measurements in certain restricted applications. The limitations and potentialities of this method for determining particle size are discussed in detail. GRA

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N75-29426* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMBINATION AUTOMATIC-STARTING ELECTRICAL PLASMA TORCH AND GAS SHUTOFF VALVE Patent
Gabriel M. Giannini, inventor (to NASA) (Giannini Scientific Corp.) Issued 10 Oct. 1961 5 p Filed 5 Oct. 1959 Sponsored by NASA
(NASA-Case-XLE-10717; US-Patent-3,004,189; US-Patent-Appl-SN-844243; US-Patent-Class-315-111) Avail: US Patent Office CSCL 13K

A remote-operated combination plasma torch and shutoff valve is described which may be employed to control the attitude of a satellite and which is characterized by high efficiency and extreme gas economy. A satellite-propulsion apparatus is discussed of the type in which a multiplicity of bursts of power are employed to maintain the vessel oriented in space. It was adapted to prevent or minimize loss of propellant at the beginning and end of each power burst and to maintain the increased

efficiency of the arc-jet propulsion system as compared to other propulsion systems. Official Gazette of the U.S. Patent Office

N75-29427 British Library Lending Div., Boston Spa (England).
VIBRATIONS IN CENTRIFUGAL PUMP UNITS BY EXTERNAL SYSTEMS
Y. N. Chen and P. Beurer 17 Jan. 1975 60 p refs Transl. into ENGLISH German Paper No. 6, 1973
(BLL-CE-Trans-6643-(9022.09); Paper-6) Avail: British Library Lending Div., Boston Spa, Engl.: 7 BLL photocopy coupons

Experiments were conducted which show that the instability of the rotor system is due to the feedback effect between its natural torsional and bending vibrations and that where two natural frequencies are close to one another, a strong vibration of the rotor system can occur. Free orbital movement of the gear coupling spacer was investigated as the cause of instability in the pump system; a critical analysis was made of the literature dealing with the influence of trailing edge forms of reinforcement webs and guide vanes on their vibrations, which are excited by the formation of the Karman vortex street in the wake. The distance of the separation point of the free shear layer to the outer trailing edge of the pates appears to be a characteristic length, based upon which a correlation for the intensity of the dynamic vortex force can be established. Author

N75-29428 British Library Lending Div., Boston Spa (England).
THE USE OF BERNSTEIN POLYNOMIALS IN APPROXIMATING A FUNCTION AND ITS DERIVATIVE
V. V. Tihomirov and M. N. Halitov [1974] 7 p refs Transl. into ENGLISH from Avtometriya (USSR), v. 2, Mar./Apr. 1974 p 89-91
(BLL-M-23707-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 1 BLL photocopy coupon

In obtaining the dynamic characterization of a gas turbine engine as a control device, the oscillograms of the transition processes of acceleration and deceleration f(t) were used to find the derivative of the transition process f prime(t). The transition process f(t) is recorded at (n+1) points at equal time-steps t. To automate computer construction of the control device's dynamics requires a mathematical apparatus which will yield analytical expressions both for the transition process f(t) and for its derivative f prime(t). Bernstein's polynomials were used to solve the problem. Author

N75-29429*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OPERATING LIMITATIONS OF HIGH SPEED JET LUBRICATED BALL BEARINGS
Erwin V. Zaretsky, Hans Signer (Industrial Tectonics, Inc.), and Eric N. Bamberger (GE Co., Cincinnati) 1975 26 p refs To be presented at Lubrication Conf., Miami Beach, Fla., 21-23 Oct. 1975; sponsored by Am. Soc. of Lubrication Engr. and Am. Soc. of Mechanical Engr.
(NASA-TM-X-71678; E-8400) Avail: NTIS HC $3.75 CSCL 13I

A parametric study was performed with 120-mm bore angular-contact ball bearings having a nominal contact angle of 20 degrees. The bearings had either an inner- or an outer-race land riding cage, and lubrication was by recirculating oil jets which had either a single or dual orifice. Thrust load, speed, and lubricant flow rate were varied. Test results were compared with those previously reported and obtained from bearings of the same design which were under-race lubricated but run under the same conditions. Jet lubricated ball bearings were limited to speeds less than 2,500,000 DN, and bearings having inner-race land riding cages produced lower temperatures than bearings with outer-race land riding cages. For a given lubricant flow rate dual orifice jets produced lower bearing temperatures than single orifice jets, but under-race lubrication produced lower bearing temperatures under all conditions of operation with no apparent bearing speed limitation. Author

N75-29430*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CYCLICAL BI-DIRECTIONAL ROTARY ACTUATOR Patent Application
William C. Stange, inventor (to NASA) Filed 17 Jul. 1975 21 p
(NASA-Case-GSC-11883-1; NASA-Case-GSC-11974-1; NASA-Case-GSC-11975-1; US-Patent-Appl-SN-596787) Avail: NTIS HC $3.25 CSCL 13I

A thermally powered rotary actuator is disclosed which is used for positioning a shaft in first and second positions which are disposed 180 deg apart. A pair of heat extensible springs are attached to the shaft and to the frame of the rotary actuator for selectively rotating the shaft from one of its two positions to the other position upon the application of heat to one of the heat extensible springs. The heat extensible springs are preferably constructed from the alloy 55-Nitinol. In the preferred embodiment, a detent mechanism is provided for locking the rotatable shaft in its two rotary positions. NASA

N75-29431*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
PARTICULATE AND SOLAR RADIATION STABLE COATING FOR SPACECRAFT Patent Application
Wayne S. Slemp, inventor (to NASA) Filed 16 May 1975 8 p
(NASA-Case-LAR-10805-2; US-Patent-Appl-SN-578240) Avail: NTIS HC $3.25 CSCL 11C

A laminate thermal control coating for spacecraft comprised of a layer of solar radiation stable film, a layer of particulate radiation stable film applied to the upper surface of the solar radiation stable film, and a layer of reflecting material applied to the lower surface of the solar radiation stable film is proposed. The coating experiences no increase in solar radiation absorbtance upon exposure to particulate or solar radiation as the particulate radiation is substantially absorbed in the particulate radiation stable layer. The solar radiation partially absorbed by the particulate radiation stable layer is transmitted by the solar radiation stable film to the reflecting material which reflects it back through the laminate and into space. NASA

N75-29432*# National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
AN IMPROVED FIFTH WHEEL Patent Application
William P. Albrecht, inventor (to NASA) and Ralph H. Sparks Filed 22 Jul. 1975 21 p
(NASA-Case-FRC-10081-1; US-Patent-Appl-SN-598504) Avail: NTIS HC $3.25 CSCL 13F

An improved fifth wheel for a tractor trailer rig is described. The wheel is characterized by a first subassembly including a wear plate adapted to be mounted on a downwardly facing surface of a trailer with a normally projected king pin. A second subassembly is adopted to be pivotally mounted on an upwardly facing surface of a tractor and brought into contiguous relation with the first subassembly. A receiver is included for capturing the king pin and safety means responsive to a failure of the king pin or its latching mechanism for joining the first subassembly with the second subassembly. NASA

N75-29433*# Detroit Diesel Allison, Indianapolis, Ind.
PRELIMINARY DESIGN STUDY OF A QUIET, HIGH FLOW FAN (QHF) STAGE
C. L. Walker, L. S. Kisner, R. A. Delaney, A. A. Beguhn, and D. E. Frye 15 Oct. 1974 74 p refs
(Contract NAS3-18521)
(NASA-CR-134780; EDR-8317) Avail: NTIS HC $4.25 CSCL 13I

Concepts selected to reduce fan generated noise in a turbofan are presented. Near-sonic flow at the fan inlet to reduce upstream propagated noise and the use of long-chord vanes to reduce downstream noise is discussed. The near-sonic condition at the rotor inlet plane was achieved by designing for high specific mass flow and by maintaining the high flow at reduced power by variable stators and variable fan exhaust nozzle. The long-chord vanes reduce response to unsteady flow. The acoustic design showed that long-chord stators would significantly reduce turbofan source noise and that other stator design parameters have no appreciable effect on noise for the spacing and chord length of the turbofan design. Four rig flow paths studied in the aerodynamic preliminary design are discussed. Noise prediction results indicate that a turbofan powered aircraft would be under federal air regulations levels without any acoustic treatment. Author

N75-29434*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF DYNAMIC CAPACITY OF LOW-CONTACT-RATIO SPUR GEARS USING LUNDBERG-PALMGREN THEORY
John J. Coy Washington Aug. 1975 51 p refs Prepared in cooperation with Army Air Mobility R and D Lab., Cleveland
(NASA-TN-D-8029; E-8164) Avail: NTIS HC $4.25 CSCL 13I

A concise mathematical model is developed for surface fatigue life of low-contact-ratio spur gears. The expected fatigue life of the pinion, gear, or gear sets may be calculated from the model. An equation for the dynamic capacity of the gear set was also derived in terms of the transmitted tangential tooth load which will give a 10-percent fatigue life of one million pinion revolutions. The theoretical life was compared with experimental data for a set of VAR AISI 9310 gears operating at a Hertz stress of 1.71X10 to the 9th power newtons per square meter (248,000 psi) and 10 000 revolutions per minute. Good agreement was obtained between the experimental and theoretical surface fatigue life of the gears. Author

N75-29435*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF PITTING FATIGUE LIFE OF AUSFORGED AND STANDARD FORGED AISI M-50 AND AISI 9310 SPUR GEARS
Dennis P. Townsend, Eric N. Bamberger (GE, Evendale, Ohio), and Erwin V. Zaretsky Washington Aug. 1975 26 p refs
(NASA-TN-D-8030; E-8258) Avail: NTIS HC $3.75 CSCL 13I

Standard forged and ausforged spur gears made of vacuum-induction-melted, consumable-electrode, vacuum-arc-remelted AISI M-50 steel were tested under conditions that produced fatigue pitting. The gears were 8.89 cm (3.5 in.) in pitch diameter and had tip relief. The M-50 standard forged and ausforged test results were compared with each other. They were then compared with results for machined vacuum-arc-remelted AISI 9310 gears tested under identical conditions. Both types of M-50 gears had lives approximately five times that of the 9310 gears. The life at which 10 percent of the M-50 ausforged gears failed was slightly less than that at which the M-50 standard forged gears failed. The ausforged gears had a slightly greater tendency to fail by tooth fracture than did the standard forged gears, most likely because of the better forging and grain flow pattern of standard forged gears. Author

N75-29436*# Life Systems, Inc., Cleveland, Ohio.
EVALUATION OF THE ELECTROCHEMICAL O2 CONCENTRATOR AS AN O2 COMPRESSOR Final Report
R. D. Marshall and J. N. Carlson Aug. 1975 77 p refs
(Contract NAS2-7704)
(NASA-CR-137688; LSI-ER-195-7) Avail: NTIS HC$4.75 CSCL 13H

A program was successfully completed to analytically and experimentally evaluate the feasibility of using an electrochemical oxygen (O2) concentrator as an O2 compressor. The electrochemical O2 compressor (EOC) compresses 345 kN/sq m (50 psia) O2 generated on board the space vehicle by the water electrolysis subsystem (WES) in a single stage to 20,700 kN/sq m (3000 psia) to refill spent extravehicular equipment O2 bottles and to eliminate the need for high pressure O2 storage. The single cell EOC designed, fabricated, and used for the feasibility testing is capable of being tested at O2 pressures up to 41,400 kN/sq m (6000 psia). A ground support test facility to test the EOC cell was designed, fabricated, and used for the EOC feasibility testing. A product assurance program was established, implemented, and maintained which emphasized safety and materials compatibility associated with high pressure O2 operation. A membrane development program was conducted to develop a membrane for EOC application. Data obtained using a commercially available membrane were used to guide the development of the membranes fabricated specifically for an EOC. A total of 15 membranes were fabricated. Author

N75-29437# Laboratoire de Recherches Balistiques et Aerodynamiques, Vernon (France).
BALL BEARINGS FOR INERTIAL TYPE GYROSCOPES: LOW SPEED OPERATION STUDY [ROULEMENTS A BILLES POUR GYROSCOPES DE CLASSE INERTIELLE. ETUDE DU FONCTIONNEMENT A BASSE VITESSE]
Tricot 22 Oct. 1974 49 p refs In FRENCH
(Contract DTEn-73.70.195)
(LRBA-E-602-NT-26/SIE) Avail: NTIS HC $3.75

Low speed behavior is analyzed of gyroscope ball bearings under different operating conditions: variable temperature, presence of the housing, variable oil mass. Measured parameters characterize the functioning of the metallic parts. Results show that the friction moment is independent from the housing's presence, and is related essentially to metal parts mutual contact, surface properties, and lubrication. ESRO

N75-29438# Army Foreign Science and Technology Center, Charlottesville, Va. Foreign Technology Div.
NEW MACHINERY AND MATERIALS
E. Muslin Aug. 1974 15 p Transl. into ENGLISH from Unidentified Russian Book Moscow, 1972 p 4-12, 42-46
(AD-A005953; FSTC-HT-23-1135-73) Avail: NTIS CSCL 11/6

The first section reviews in brief such new developments in the field of materials as iron and tungsten whiskers with strengths of 1400 g/sq mm; aluminum and other materials reinforced with these whiskers; translucent steel shot through with tiny holes; the alloy Nitinol-55, which remembers a shape imparted to it when heated and resumes this shape when reheated; and to sodium as an electrical conductor. The second section touches upon the use of lasers especially in connection with the photohydraulic effect by which a laser produces shock waves in a water-filled vessel. The use of this effect to clean metal castings appears promising. GRA

N75-29439# Army Foreign Science and Technology Center, Charlottesville, Va.
WEST GERMAN SELF-PROPELLED CRANES WITH HYDRAULIC BOOMS
O. A. Smirnov, L. V. Zaitsev, and T. C. Vdovina 10 Mar. 1974 15 p Transl. into ENGLISH from Stroit. i Dorozhnye Mashiny (USSR), no. 4, 1972 p 14-18
(AD-A005948; FSTC-HT-23-964-73) Avail: NTIS CSCL 13/3

Recent developments in crane construction in West Germany are reviewed with particular attention to cranes on automobile chassis with telescopic booms and combination tower-boom equipment, manufactured by three leading W. German firms. Basic and auxiliary power operations of these cranes mechanized with the aid of hydraulic driving gears are described in some detail. The cranes are almost fully automatic, with automatic alarm and shutoff systems in case of overload. Two-way radio communications systems enabling helicopters to direct the crane's placement are mentioned as important recent inclusions in W. German crane construction. GRA

N75-29440# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.
PERFORMANCE OF ARMY ENGINES WITH LEADED AND UNLEADED GASOLINE. PHASE 2: FIELD STUDY EVALUATION Final Report, Nov. 1973 - Nov. 1974
John D. Tosh, Alan A. Johnston, and Edwin A. Frame Jan. 1975 85 p
(Contract DAAD05-72-C-0427)
(AD-A005577; AFLRL-54) Avail: NTIS CSCL 21/7

The first year's operation on unleaded gasoline has been completed with more than 20,000,000 vehicle miles and many hours accumulated on Material Handling Equipment and other ground power equipment. It can generally be concluded that Phase II has proven that Army gasoline powered equipment and vehicles can be operated during their normal daily activities on unleaded gasoline in the octane quality range used in the program for long periods of time without any apparent fuel economy penalties and with no increase in maintenance or operating costs. During Phase II there were no engine failures that could be attributed to the unleaded gasoline, there was no evidence of engine performance degradation; in fact, there were driver reports of better engine performance on the unleaded fuel. This is not at all surprising since cleaner burning engines had been observed during Phase 1 and longer life was obtained from spark plugs during the field evaluation. GRA

N75-29441# TRW, Inc., Cleveland, Ohio.
FORGED METAL POWDER GEARS Final Report, 1 Jul. 1972 - 30 Aug. 1974
F. T. Lally and I. J. Toth Sep. 1974 92 p refs
(Contract DAAE07-72-C-0277)
(AD-A005787; TRW-ER-7603-F; TACOM-TR-11960) Avail: NTIS CSCL 13/9

A powder metallurgy (P/M) forging technology for production of critical Army automotive gears was established. The variables investigated during the program included powder compositions, forging temperature, die temperature, preform configuration, press type and a combined wrought-P/M process (composite) for producing forged gears. The selected process employed 4600 prealloyed powder and sintering and forging temperatures of 2200F. A simplified preform configuration involving 3 dimensional metal flow in a closed die system was used to produce forged pinions. An extrude-forge process was employed to produce the gears. The properties of the P/M forged material were shown to be comparable to wrought material of similar composition. Cost analysis indicated that the process was capable of providing significant cost reductions achieved through material savings and reduction or elimination of machining operations. GRA

N75-29442# Naval Ship Research and Development Center, Bethesda, Md.
DESIGN OF A 9 INCH CYCLOIDAL PROPELLER MODEL UNIT AND SOME EXPERIMENTAL RESULTS
Basil V. Nakonechny Nov. 1974 58 p refs
(SF0130710)
(AD-A005768; NSRDC-3150) Avail: NTIS CSCL 13/10

This report presents a description of the 9-inch orbit diameter cycloidal (vertical axis) propeller model unit, designed and built at the Naval Ship Research and Development Center. A portion of the results from early experimental investigations obtained by means of this propeller model unit using six, three, and two blades is also presented. The investigations were conducted in open water and included cycloidal and modified cycloidal blade motions. The tests were carried out at constant rpm of 300,400,500, and 600, respectively. The speed of advance varied from zero to above the speed for zero thrust. GRA

N75-29443# Mechanical Technology, Inc., Latham, N.Y.
A THEORETICAL AND EXPERIMENTAL INVESTIGATION OF THE MAGNETIC FIELDS AND FORCES ARISING IN MAGNETIC SUSPENSION SYSTEMS
J. Walowit and P. R. Albrecht Jan. 1975 84 p refs
(Contract N00014-73-C-0274)
(AD-A006109; MTI-74TR21) Avail: NTIS CSCL 13/9

Analytical and experimental studies have been performed to obtain the fundamental relationships governing the transverse forces between an axially active, transversely passive electromagnetic supporting system. The basic criteria have been obtained for a plane geometry. Approximate solutions have been obtained with the use of some simplifying assumptions regarding the boundary conditions which permitted relatively straightforward solutions to be obtained through the use of conformal mapping with Schwarz-Christoffel transformations. A static experimental apparatus has been developed for measuring axial and tangential forces and fluxes in the gap between the magnetic surfaces. Good agreement between theory and experiment has been obtained. The theory indicates the existence of optimum geometric configurations which can provide maximum degree of stiffness and tangential force for a given surface area and provides the criteria for determination of these configurations. GRA

N75-29444# Army Foreign Science and Technology Center, Charlottesville, Va.
DESIGN OF HYDRAULIC ROLLERS FOR TREATING CERAMIC MATERIALS WITH CONSIDERATION
A. S. Timoshuk 21 Nov. 1974 6 p Transl. into ENGLISH from Stroit. Dor. Mashiny (USSR), no. 9, 1972 p 25-26
(AD-A006099; FSTC-HT-23-326-75) Avail: NTIS CSCL 13/9

Investigations of hydraulic rollers for treating clay materials were conducted to create the methodology of engineering computations with consideration of reliability parameters. Measurements of factual load values, power requirements, thrust, and other forces which occur during operating conditions are considered. M.J.S.

N75-29445# Army Foreign Science and Technology Center, Charlottesville, Va.
THE APPLICATION OF THE PHENOMENON OF SELECTIVE TRANSFER TO INCREASE THE DURABILITY OF PARTS IN FUEL UNITS
G. I. Rumyantsev 15 Aug. 1974 10 p Transl. into ENGLISH from Izbiratelnyi Perenos v Uzlakh Treniya (Moscow), 1971 p 76-81
(AD-A005975; FSTC-HT-23-0897-74) Avail: NTIS CSCL 13/11

A method of finishing the bearing surfaces in fuel pumps and regulators is described. The method entails the friction application of a copper based solid lubricant coating using a lathe attachment. The description includes a drawing of the lathe accessory, detailed data on the procedure and results, and an initial general discussion of the theoretical considerations underlying the method. GRA

N75-29446# Denver Research Inst., Colo.
CENTER FOR HIGH ENERGY FORMING Final Technical Report
Steve H. Carpenter Nov. 1974 89 p refs
(Contract DAAG46-72-C-0130; ARPA Order 720)
(AD-A006259; AMMRC-CTR-74-69) Avail: NTIS CSCL 13/8

This report contains the results of studies conducted in the following areas: determination of optimum explosion welding parameters; diffusion studies in explosion welded metals; explosive forming of spherical gore segments; explosive thermo-mechanical processing of beta III titanium alloy; free forming of infinite plates under arbitrary charge distributions. GRA

N75-29447# Oak Ridge Associated Universities, Tenn. Manpower Development Div.
TAT WELDING TECHNOLOGY TRAINING PROGRAM
Everette N. Rogers and Jerry L. Cook Jan. 1975 34 p refs
(PB-241047/0; Rept-1-75-2) Avail: NTIS HC $3.75 CSCL 05I

The report describes the curriculum and teaching methods and philosphy of the Training and Technology Welding Technology Training Program. The training takes 1040 hours, 6 months and 40 hours a week. Graduates are certifiable in plate and pipe electric arc welding, and are introduced to gas welding techniques. Training is conducted in an industrial setting. GRA

N75-29275 Idaho Univ., Moscow. Dept. of Mechanical Engineering.
STABILITY AND TRANSIENT MOTION OF A HYDRODYNAMIC HORIZONTAL THREE-LOBE BEARING SYSTEM
G. L. Falkenhagen *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 7, No. 5 May 1975 p 77-92 refs (For availability see N75-29272 20-31)

N75-29276 Ohio Univ., Athens. Dept. of Mechanical Engineering.
PARAMETER OPTIMIZATION OF VIBRATION ABSORBERS AND SHOCK ISOLATORS BY ROOT-LOCUS TECHNIQUE
Fan Y. Chen and O. E. Adams, Jr. *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 7, No. 5 May 1975 p 93-100 refs (For availability see N75-29272 20-31)

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N75-29448 British Library Lending Div., Boston Spa (England).
THOUGHTS ON MINER'S FATIGUE DAMAGE RULE
M. Matolcsy 9 Dec. 1974 17 p refs Transl. into ENGLISH from the Hungarian Presented at the Congr. on Mater. Testing, Budapest, 19-24 Oct. 1970

(BLL-RAE-Trans-5207-(1609)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.: 2 BLL photocopy coupons

The derivation of Miner's fatigue damage rule is briefly outlined and the limits of its applicability are indicated. The shortcomings of his basic assumptions are discussed in the light of more recent knowledge concerning such matters as load sequence effects, dislocation theory of internal work, and the problem of defining failure. Several newer damage rules from other authors are presented, with a brief indication of the improvements introduced. A list of conditions which should be fulfilled by an ideal damage rule is suggested. Author

N75-29449*# Boeing Aerospace Co., Seattle, Wash. Research and Engineering Div.

FRACTURE CONTROL METHOD FOR COMPOSITE TANKS WITH LOAD SHARING LINERS Final Report, Jul. 1971 - Feb. 1975

W. D. Bixler Jul. 1975 260 p refs

(Contract NAS3-14380)

(NASA-CR-134758; D180-18850-1) Avail: NTIS HC $8.50 CSCL 14D

The experimental program was based on the premise that the plastic sizing cycle, which each pressure vessel is subjected to prior to operation, acts as an effective proof test of the liner, screening out all flaws or cracks larger than a critical size. In doing so, flaw growth potential is available for cyclic operation at pressures less than the sizing pressure. Static fracture and cyclic life tests, involving laboratory type specimens and filament overwrapped tanks, were conducted on three liner materials: (1) 2219-T62 aluminum, (2) Inconel X750 STA, and (3) cryoformed 301 stainless steel. Variables included material condition, thickness, flaw size, flaw shape, temperature, sizing stress level, operating stress level and minimum-to-maximum operating stress ratio. From the empirical data base obtained, a procedure was established by which the service life of composite tanks with load sharing liners could be guaranteed with a high degree of confidence. Author

N75-29450# Sheffield Univ. (England). Dept. of Probability and Statistics.

PREDICTIVE DISTRIBUTIONS IN LIFE TESTS UNDER COMPETING CAUSES OF FAILURE

G. A. Bancroft and I. R. Dunsmore May 1975 12 p refs

(RR-166/GAB/IRD/1) Avail: NTIS HC $3.25

In competing risk life testing models, the units under test can fail due to one of several competing risks. The estimation of parameters in such compound models was investigated; predictive distributions and probabilities are derived for such situations, and the predictions obtained are compared with some of the classical analogues. Author

N75-29451# National Centre of Tribology, Risley (England). European Space Tribology Lab.

THERMAL VACUUM QUALIFICATION TEST OF NO. 1 MARCONI SPACE AND DEFENCE SYSTEMS LOW SPEED MECHANISMS

D. A. Appleton Jan. 1975 53 p

(Contract ESRO-1560/72)

(ESRO-ESTL-11; ESRO-CR(P)-646) Avail: NTIS HC $4.25

A test to demonstrate the satisfactory performance of solar paddle drive mechanism to be used onboard a geostationary satellite is described with the thermal conditions being more severe than those occurring during satellite operation. The thermal tests were specified to simulate a range of shaft and housing temperatures controlled at different levels at a vacuum pressure better than 0.000001 torr. Methods of achieving these conditions are described as well as the mechanism performance. Four thermal vacuum tests of 8 hour duration were carried out. Due to motor magnet clampet ring displacement, the mechanism did not pass the first qualification test; after realignment of the ring, the mechanism was retested and performed satisfactorily in all four thermal tests. The mechanism was subjected to an accelerated life test of about one year duration, having an equivalent in orbit time of approximately 25 years. ESRO

N75-29452# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

EVALUATION OF Ni-Cd CELL COVERS. RESULTS OF TESTING OF COVERS WITH PROTECTED BRAZING FILLET

W. J. VanderVet Jan. 1975 56 p

(Contract ESTEC-2019/73-35)

(NLR-TR-75033-C; ESRO-CR(P)-656) Avail: NTIS HC $4.25

Three types of covers were tested by potentio-dynamic scanning to assess whether nickel plating or nickel plating and molded Araldite potting gives sufficient protection against the electro-corrosive attack of brazing fillets. The unprotected covers failed after a short testing period by a partial short circuit between the lead-through and the cover. The protected covers did not fail during the testing period. It is concluded that nickel plating provides better protection than nickel plating combined with potting. Author (ESRO)

N75-29453# Southwest Research Inst., San Antonio, Tex.

FATIGUE DAMAGE EQUIVALENCE OF FIELD AND SIMULATED VIBRATIONAL ENVIRONMENTS Final Report, 1 Nov. 1973 - 30 Dec. 1974

Daniel D. Kana and Dennis C. Scheidt Nov. 1974 54 p refs

(Contract DAAD05-74-C-0729; SwRI Proj. 02-3825)

(AD-A006226) Avail: NTIS CSCL 15/5

A method is developed for comparing the fatigue damage equivalence of field and laboratory simulated vibration environments. It involves the use of a model hardware specimen which is instrumented to record typical strain-time histories that occur in a given environment. The device is used to acquire data from both the field and corresponding laboratory simulation. The resulting strain-time histories are analyzed for fatigue damage potential. This analysis is based on the use of fatigue life gages. A mission ratio is defined for each pair of strain histories so that the degree of simulation achieved can be expressed in terms of the number of equivalent missions experienced. The technique is applied to OH-58A Helicopter, M-35 Truck, and M-113 Armored Personnel Carrier vehicle environments and their simulations. It is found that a typical uniaxial test simulation provides a rather poor duplication of the actual multi-axial field environments. GRA

N75-29454# Military Aircraft Storage Disposition Center, Davis-Monthan AFB, Ariz.

DESERT STORAGE TEST PROGRAM Final Report, Jan. 1972 - Feb. 1974

William C. Connors, John A. Blind, and Leslie R. Klein 20 Mar. 1974 250 p refs

(AD-A006103) Avail: NTIS CSCL 01/3

This report examines long term aircraft preservation and storage procedures at the Military Aircraft Storage and Disposition Center, Davis-Monthan Air Force Base, Arizona. It presents the Desert Storage Test Program conducted between January 1972 and February 1974. The best long term aircraft preservation process is discussed in terms of the storage related deterioration of aircraft. Special emphasis is placed on environmental conditions inside the aircraft during storage. GRA

N75-29455# General Electric Co., Syracuse, N.Y. Heavy Military Equipment Dept.

THE AVAILABILITY, RELIABILITY AND MAINTAINABILITY OF REDUNDANT SYSTEMS

C. A. Papenfuss Sep. 1974 33 p refs

(AD-A006369; R74EMH20) Avail: NTIS CSCL 14/4

Redundancy is widely used to enhance an overall system's effective availability, reliability and maintainability. The application of redundancy in one of its simplest but most common forms involves systems composed of iterative subsystems. All of the subsystems, including those considered redundant, are assumed to be independent, continuously energized and on line. The mathematical models representing the redundant system availability, reliability and maintainability have been derived using Markov chains and matrix methods. A simple computer program is described for the application of the derived models. GRA

N75-29456# Army Materiel Command, Texarkana, Tex. Intern Training Center.

A DEVELOPMENT AND ANALYSIS OF MULTIPLE RANGE TECHNIQUES FOR CONTROLLING THE VARIABILITY OF A PROCESS CHARACTERISTIC WITH A UNIFORM DISTRIBUTION Final Report

Richard Dan Abeyta May 1974 96 p
(AD-A006478; USAMC-ITC-02-08-73-201) Avail: NTIS CSCL 13/8

The Shewhart range chart is the most commonly used method of controlling process variability. The statistic plotted on this chart is the outer range of values of random samples from a repetitive process. As an extension of the use of ranges, the primary objective of this research is the development of quality control techniques in which two ranges are computed rather than just one. It is anticipated that two ranges provide more information and consequently are more discriminating at the expense of only a slight increase in necessary calculations. Several multiple-range plans and a single range plan are developed for random samples of size four from a uniform distribution. In each case, expressions for alpha and beta errors are derived. The operating characteristic (O.C.) curve, which is a plot of beta error against actual process variation, for a specified alpha level, is the principle criterion of comparison. The plan with the lowest overall O. C. curve is the most discriminating and consequently the most desirable. The conclusion drawn from this analysis is that multiple-range plans have no increase in discriminating ability over single range plans for samples of size four from a uniform distribution. GRA

N75-29457# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
COST ESTIMATING RELATIONSHIPS FOR PREDICTING LIFE CYCLE COSTS OF INERTIAL MEASUREMENT UNIT MAINTENANCE M.S. Thesis
Lynn M. Lynch and Neil V. Raymond 29 Jan. 1975 92 p refs
(AD-A006344; SLSR-16-75A) Avail: NTIS CSCL 15/5

A major problem to life cycle cost planners is the scarcity of tools available for use in the conceptual phase of system design and acquisition that accurately predict operational and support costs. This thesis developed a cost-estimating relationship (CER) that predicts maintenance costs of inertial measurement units (IMUs) using only design and policy data that would be available to planners in the conceptual phase of weapon system acquisition. The cost estimated is the average quarterly maintenance cost per aircraft. The estimating variables are selected based on two criteria: (a) Is the variable one that, viewed logically, would affect maintenance costs, (b) Is the variable one that would be known to planners in the conceptual phase of weapon system acquisition. The CER was developed by the ordinary least squares method of multiple regression analysis. GRA

N75-29458# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN EVALUATION OF HEURISTIC SCHEDULING RULES BY USING A ZERO-ONE LINEAR PROGRAMMING APPROACH M.S. Thesis
Doan Minh Jan. 1975 150 p refs
(AD-A006348; SLSR-19-75A) Avail: NTIS CSCL 15/5

This study attempted to find some heuristic scheduling rules that would consistently generate good schedules in military aircraft maintenance environments. Heuristic rules considered were those commonly used in the military aircraft field or frequently mentioned in scheduling literature. There was no attempt to study heuristic rules exhaustively. To test heuristic rules, ten aircraft maintenance scenarios were created, based on data collected from the 17th Bombardment Wing (SAC). Constraints imposed in these scenarios were: limited resources, precedence relations between jobs; project and job due dates; and concurrent and nonconcurrent job performance requirements. Each maintenance scenario was modeled, using a zero-one linear programming formulation developed by Alan B. Pritsker, et al. and published in a Rand report. By use of an existing computer code to solve this formulation, the optimum solution of each scenario was found. GRA

N75-29459# Exxon Research and Engineering Co., Linden, N.J. Government Research Lab.
MECHANICAL FAILURE PROGNOSIS THROUGH OIL DEBRIS MONITORING Final Report, 18 Jun. 1973 - 1 Aug. 1974
Alan Beerbower Jan. 1975 136 p refs
(Contract DAAJ02-73-C-0094; DA Proj. 1F1-62203-A-119)
(AD-A006190; Rept-7204-412011; USAAMRDL-TR-74-100) Avail: NTIS CSCL 11/8

This report presents the results of a study on making optimum use of oil analysis methods for failure prognosis on helicopters. Since the most promising methods have very little statistical history, it was necessary to depend quite heavily on collecting engineering opinions and analyzing them for consensus. The conclusion reached by this process is that it should be feasible to raise the success of prognosis to a very high level, perhaps approaching 98%, without undue expenditure of funds or labor. This would involve two steps: Provide the organizational maintenance shops with a simple device to measure the fine wear particles content, and provide the aircraft with chip collectors which have more prognostic value, and use these coarse chips as a second channel of information at the shops and laboratories. GRA

N75-29460# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
EVALUATION OF PROPOSED CRITERIA TO BE USED IN THE SELECTION OF CANDIDATED FOR RELIABILITY IMPROVEMENT WARRANTIES M.S. Thesis
Payton E. Dunn, Jr. and Andrew W. Oltyan Jan. 1975 118 p refs
(AD-A006335; SLSR-7-75A) Avail: NTIS CSCL 15/5

As DOD's percentage of the budget continues to decline, there is an increasing need to get more for the defense dollar. One way to achieve this objective is through the use of Reliability Improvement Warranties (RIW). The RIW calls for a total repair contract based on a pre-determined Mean Time Between Failure (MTBF). The contractor to whom the contract is let can realize increased profits by increasing the MTBF of the item. He does this by initiating No Cost Engineering Change Proposals which will increase item performance and reliability. The study was designed to survey the existing population of items covered by a RIW to determine what characteristics they had in common. GRA

N75-29461# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
COMPUTER ASSISTED INSTRUCTIONS IN SYSTEM RELIABILITY FOR LOGISTICS MANAGERS
Walter H. Elbinger and John Keskula Jan. 1975 225 p refs
(AD-A006340; SLSR-12-75A) Avail: NTIS CSCL 14/4

This thesis provides the logistics manager with computer aided instructions in solving reliability problems. The report presents five computer programs for solving the reliability problem. GRA

N75-29462# Summa Corp., Culver City, Calif. Hughes Helicopters Div.
FAILSAFE/SAFE-LIFE INTERFACE CRITERIA Final Report, Oct. 1973 - Oct. 1974
James F. Needham Jan. 1975 96 p refs
(Contract DAAJ02-74-C-0005; DA Proj. 1F1-62808-A-170)
(AD-A006131; HH-74-141; USAAMRDL-TR-74-101) Avail: NTIS CSCL 01/3

The purpose of this study was to develop rational failsafe/safe-life interface criteria for the design of helicopter structural components. Present specifications containing design criteria were reviewed and deficient areas defined. Rational design criteria were developed and are titled Damage-Tolerant Design Criteria. Damage-tolerant design concepts are presented for various helicopter structural components. They include redundant structure, controlled fracture structure and failure indicating systems. The Hughes OH-6A main rotor blade was selected as the structural component to establish the effects on life-cycle costs in designing to different structural criteria and using different damage-tolerant design concepts. GRA

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N75-29463 British Library Lending Div., Boston Spa (England).
EXPERIMENTAL TEST OF THE LOAD BEARING CAPACITY OF SMOOTH GLASS FIBRE REINFORCED PLASTIC HOLLOW CYLINDERS SUBJECTED TO EXTERNAL HYDROSTATIC PRESSURE
A. A. Kritsuk, O. A. Goroshko, L. M. Babko, V. S. Bochkovski, and N. A. Bondarenko 9 Jul. 1974 5 p refs Transl. into ENGLISH from Prikl. Mekh. (USSR), v. 9, 1973 p 71-75
(BLL-NEL-TT-2564-(6075.461)) Avail: British Library Lending Div., Boston Spa, Engl.: 1 BLL photocopy coupon

The results of experimental investigations of the load bearing capacity of smooth glass-fiber reinforced plastic hollow cyclinders subjected to hydrostatic pressure are given along with the results of calculating the critical load. The experimental specimens of hollow cylinders were manufactured by the method of wet winding glass filament on a plaster and metal mandrel. As the filler nonalkaline glass filament NS 55/6 was used and as the matrix epoxyphenol binder EFB-4. The glass filament was wound in layers with a ratio of layers wound circumferentially and longitudinally (along the axis of the cylinder) of 2:1 and 3:2. When the quality of the manufactured cylinders was tested, no defects were found; the variation in the thickness of the walls was approximately 2%. Author

N75-29464+ Engineering Sciences Data Unit, London (England).
INFORMATION ON THE USE OF DATA ITEMS ON STRUTS
Feb. 1975 3 p
(ESDU-01.01.00) Copyright. Avail: NTIS HC $7.50

Data are presented which deal with the strength ,and stability of struts according to the conditions of end and side loads, including eccentricity. Three basic types of instability for struts of thin-walled cross section are considered, namely flexural and torsional-flexural instability and local buckling. A synopsis of data on struts is included, and examples to illustrate the modes of deformation for the various types of instability are shown. Author

N75-29465 Shock and Vibration Information Center (Defense), Washington, D.C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 7, NO. 2, FEBRUARY 1975
Feb. 1975 96 p refs
(AD-A006665/4) Avail: Paper copy available from Shock and Vibration Center, Naval Research Lab., Code 6020, Washington, D. C. 20390. Annual subscription $40.00 CSCL 20K

The finite element analysis is discussed of shocks and acceleration waves in nonlineary elastic solids. Abstracts are presented of articles dealing with analysis and design, computer programs, environments, phenomenology, experimentation, components, and systems. Literature review and book reviews are included. M.J.S.

N75-29466+ Engineering Sciences Data Unit, London (England).
STIFFNESSES OF LAMINATED FLAT PLATES
Jan. 1975 16 p Sponsored by the Roy. Aeron. Soc.
(ESDU-75002) Copyright. Avail: NTIS HC $74.50

A method is described for calculating the in-plane and flexural stiffness of laminated flat plates built up from thin orthotropic layers of different material properties, thicknesses and orientations of their principal axes of orthotropy. The method is applicable to a wide range of structures constructed from, or reinforced by, laminated composite materials, such as carbon or glass fiber reinforced plastic, which consist of fibrous reinforcements in metallic or nonmetallic matrices. Author

N75-29467+ Engineering Sciences Data Unit, London (England).
STRESS ANALYSIS OF LAMINATED FLAT PLATES
Feb. 1975 17 p
(ESDU-74039) Copyright. Avail: NTIS HC $98.50

A procedure is described for estimating the stresses in laminated flat plates which are the result of both loading actions and differential contractions and expansions of the layers over the working temperature range coupled with the effect of contractions from the layer bond curing temperature. The procedure is applicable for balanced or unbalanced arrangements of layers, and to layers of different thicknesses, orthotropic, and thermal properties with varying alignments of their principal axes of orthotropy. Author

N75-29468+ Engineering Sciences Data Unit, London (England).
COEFFICIENT OF DIFFUSION FOR A UNIFORM PARALLEL PANEL
Feb. 1975 3 p refs Amendment A
(ESDU-02.05.01) Copyright. Avail: NTIS HC $7.50

A method for finding the coefficient of diffusion is presented. The method is used to determine the coefficient of diffusion for a seven stringed panel to demonstrate its application. F.O.S.

N75-29469+ Engineering Sciences Data Unit, London (England).
FLAT PANELS IN SHEAR. BUCKLING OF LONG PANELS WITH TRANSVERSE STIFFENERS
Feb. 1975 9 p refs Amendment A
(ESDU-02.03.02) Copyright. Avail: NTIS HC $7.50

Curves are presented for determining the buckling stress of long flat plates with identical-equally spaced stiffeners. An example is included for finding the buckling stress of a long-simply supported plate reinforced by top hat section stiffeners attached to one side of the plate. F.O.S.

N75-29470 British Library Lending Div., Boston Spa (England).
THE APPLICATION OF FRACTURE MECHANICS TO THE PREDICTION OF THE FATIGUE LIFE OF SHARPLY NOTCHED COMPONENTS Ph.D. Thesis
R. Wagner 3 Mar. 1975 79 p refs Transl. into ENGLISH from Munich Tech. Univ., Thesis, 1973
(BLL-CE-Trans -6544-(9022.09)) Avail: British Library Lending Div., Boston Spa, Engl.: 8 BLL photocopy coupons

The application of a fundamental concept of linear-elastic fracture mechanics to the prediction of the fatigue life of sharply notched components is discussed. This allows the ratio of Hooke maximum stresses at the notch root over the number of cycles to failures to be plotted independently of the shape of the component solely as a function of the notch radius. The effect of the notch radius on crack propagation and on the number of cycles to failure was investigated in accordance with Neuber's theories of macro and micro support. A method is described of calculating a cyclic stress/strain curve simply from the S-N curves of notched and unnotched specimens. Author

N75-29471# National Aerospace Lab., Tokyo (Japan).
OPTIMUM CONFIGURATION OF TRUSS STRUCTURES
Kazuo Kunoo Sep. 1974 12 p refs
(NAL-TR-388T) Avail: NTIS HC $3.25

The feasibility of simultaneous optimization of member sizing and structural configuration of truss structures is demonstrated. The structural analysis is treated by the finite element displacement method and the optimization accomplished by the steepest descent method. Inequality constraints including limitations on both state variables (stress and displacement) and design variables (element cross sectional areas and nodal point placement) are included. The computational results show that in the presence of displacement constraints, the configuration of the optimum design sometimes differs considerably from the fully stressed design. The techniques can be extended to other structures (such as beams, frames, plates, etc. and to include the possibility of Euler buckling. Author

N75-29472# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
COMPARATIVE PERFORMANCE OF STRUCTURAL LAYERS IN PAVEMENT SYSTEMS. VOLUME 3: DESIGN AND CONSTRUCTION OF MESL Final Report
George M. Hammitt, II Dec. 1974 41 p refs
(Contract DOT-FA71WAI-218)
(AD-A005893; S-74-74-8-Vol-3; FAA-RD-73-198-3) Avail: NTIS HC $3.75 CSCL 13/2

Design and construction procedures are described for membrane-encapsulated soil layers (MESL) in airport pavement systems; these are based on analyses of results of recent tests of full-scale accelerated traffic test sections. Included are descriptions of material and equipment requirements and recommended test methods. The procedures are applicable to both rigid and flexible airport pavement systems. Recent material developments and subsequent testing demonstrated the structural integrity of MESL type construction. It is shown that substantial savings can be realized using MESL's in airport pavements because of less strict material quality requirements and lower maintenance requirements due to the waterproofing protection provided by the MESL. Author

N75-29473*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FRACTURE TESTING WITH SURFACE CRACK SPECIMENS
Thomas W. Orange 1974 32 p refs Presented at the 9th Natl. Symp. on Fracture Mech., Pittsburgh, 25-27 Aug. 1975; sponsored by the Am. Soc. for Testing and Mater.
(NASA-TM-X-71772; E-8274) Avail: NTIS HC $3.75 CSCL 20K

Recommendations are given for the design, preparation, and static fracture testing of surface crack specimens. The recommendations are preceded by background information including discussions of stress intensity factors, crack opening displacements, and fracture toughness values associated with surface crack specimens. Cyclic load and sustained load tests are discussed briefly. Author

N75-29474*# Michigan Univ., Ann Arbor. Dept. of Mechanical Engineering.
FIBER REINFORCED SOLIDS POSSESSING GREAT FRACTURE TOUGHNESS: THE ROLE OF INTERFACIAL STRENGTH Final Report, 1 Aug. 1974 - 31 Jul. 1975
A. G. Atkins 31 Jul. 1975 60 p refs
(Grant NGR-23-005-528)
(NASA-CR-143287) Avail: NTIS HC $4.25 CSCL 20K

The results of angle-ply investigations for strength and toughness of brittle fiber/brittle filament composites are presented. General results are discussed for both unidirectional and angle-ply intermittently bonded boron/epoxy composites as affected by soaking and freezing water environments. A description of and the operating instructions are included for the modified 230 mm (9 inch) wide intermittent coating tape making apparatus. M.J.S.

N75-29475# National Aerospace Lab., Tokyo (Japan).
RESPONSE ANALYSIS OF A CLAMPED PLATE TO BOUNDARY LAYER PRESSURE FLUCTUATIONS
Yoshinori Fujimori Jan. 1975 15 p refs In JAPANESE; ENGLISH summary
(NAL-TR-401) Avail: NTIS HC $3.25

The response formulas to calculate root-mean-square (RMS) displacement of both a rectangular panel and a beam with clamped boundaries were derived by modal analysis. The quantitative estimations of RMS displacement was done with the knowledge of physical constants of the boundary layer and those of a beam or a plate. Numerical examples clarified how the dynamic RMS values of displacement are influenced by the edge conditions. In order to make clear the effect of clamping the boundaries, dynamic RMS value of a clamped plate or a beam and static deflection of a clamped plate or a beam are expressed in terms of percentage share over dynamic RMS displacement of a supported plate or a beam and static deflection of a supported plate or a beam respectively. The results for dynamic RMS displacement ratio and static deflection ratio take 30%, 20% on the beam problem, and 67%, 31% on the plate problem respectively. The discrepancy between those figures means physically that: considerable reduction in the response level is attained by constraining the edges; clamping the edges is less effective to the dynamic loading than to the static loading, is less effective in the plate problem than in the beam problem for both dynamic and static loading. Author

N75-29476# National Aerospace Lab., Tokyo (Japan).
STRENGTH OF AXIAL FLOW COMPRESSOR BLADE ROOTS. PHOTOELASTIC STRESS ANALYSIS OF THE PIN JOINT LUG
Katsutoshi Matsusue and Makoto Yonaiyama Jan. 1975 12 p refs In JAPANESE; ENGLISH summary
(NAL-TR-403) Avail: NTIS HC $3.25

The stress on the periphery of the hole in a statically loaded pin joint lug was obtained by the photoelastic method in order to find the strength of the pin joint lug having a clearance between the pin and the pin hole. The stress concentration factors were determined by the experiments of several specimens with different length ratio A/B (the hole diameter to the breadth of the lug) or with various shapes of the lug. Further experiments were made of the quasi-three dimensional lugs each of which were composed of three layers of the two dimensional lug and two spacers sandwiched between the lugs, and bonded all together by adhesive. The experimental results are summarized as follows: (1) When the length ratio (A/B) was large enough (0.67), the stress concentration of the lug increased as the clearance increased, and rapidly approached to a constant value; for the small range of the length ratio (less than 0.29), the stress concentration was slightly affected by the clearance. (2) The stress concentration of the eye-bar type lug increased rapidly as the clearance increased and approached to a much higher value compared with the approaching stress of the non-eye-bar type lug with a constant width. (3) Stresses of three lugs of the quasi-three dimensional model were obtained by the stress freezing method, and reasonable thickness ratios of the inner- to the outer-lugs were experimentally determined for the present three cases. Author

N75-29477# Tokyo Univ. (Japan).
EXPERIMENTAL STUDY ON PRECEDING VISCOELASTIC STRAIN DISTURBANCES: AN INVERSE PROBLEM IN DYNAMIC FRACTURE
Akira Kobayashi and Nobuo Ohtani Jun. 1975 12 p refs Repr. from Inst. of Space and Aeron. Sci., Univ. of Tokyo, Rept. 529 (Tokyo), v. 40, no. 9, Jun. 1975 p 245-256
(ISAS-529-Vol-40-No-9) Avail: NTIS HC $3.25

An experimental study was conducted on the inverse problem of dynamic fracture in a viscoelastic solid. The preceding wavy strain disturbances ahead of a running crack were observed through high speed schlieren photography, showing a possibility of intermittent crack propagation. It is found that the effect of breaking stress is predominant in these wavy strain disturbances in a viscoelastic solid, while the strain rate effects contribute little to the disturbances. Author

N75-29478# Technische Hogeschool, Delft (Netherlands).
ON THE COMPLEMENTARY ENERGY THEOREM IN NONLINEAR ELASTICITY THEORY
W. T. Koiter Jun. 1975 39 p refs Presented at Symp. on Trends of Appl. of Pure Mathematics to Mech., Lecce, Italy, 26-31 May 1975
(WTHD-72) Avail: NTIS HC $3.75

The controversy between Zubov's theorem of stationary complementary energy and the nonexistence of a unique inversion of the stress-strain relations involved is discussed. It is shown that the stress-strain relations in question always possess a 'multi-valued inversion.' The analysis also leads to some general sufficient conditions for the validity of a minimum principle of complementary energy. The potential usefulness of Zubov's theorem is illustrated, and a counter-example serves to demonstrate that the principle of stationary complementary energy connot always be sharpened to a minimum principle. Author

N75-29479# Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium). Section Construction Metallique.
BEHAVIOR OF FOUR STEEL LIGHTWEIGHT CONCRETE COMPOSITE BEAMS UNDER LONG LASTING LOADS [COMPORTEMENT DE QUATRE POUTRES MIXTES ACIER-BETON LEGER SOUS DES CHARGES DE LONGUE DUREE]
Jose Janss and Jean-Claude Lambert Jun. 1974 36 p refs In FRENCH Sponsored by Inst. pour l'Encour. de la Rech. Sci. dans l'Ind. et l'Agr.
(CRIF-MT-93) Avail: NTIS HC $3.75

Four beams composed of steel and light concrete were

tested during two years under constant loads. The beams were composed of an IPE 200 profile and a concrete plate. The tests show that: (1) the composite beams with light concrete have the same behavior as composed beams with normal concrete for short duration loads, (2) the creep coefficient, used for elastic calculation under long duration loads, is approximately 25% higher than the one for composite beams with normal concrete, and (3) the yield load of composite beams of steel and light concrete can be calculated in a simple manner where one assumes that the two materials are completely plastic upon rupture. ESRO

N75-29480# Loughborough Univ. of Technology (England). Dept. of Transport Technology.
RESPONSE OF THIN-WALLED CYLINDERS TO AERODYNAMIC EXCITATION, PART 1 Final Report
D. J. Johns and R. Nataraja Nov. 1974 152 p refs 2 Vol.
(Contract SN/1170/010/NPL)
(TT-7413-Pt-1) Avail: NTIS HC $6.25

A comprehensive review of the literature in the thin shell theory is presented including a detailed discussion of nonlinear effects. Importance of ground wind distribution for loading actions on full scale structures is briefly described. A review is also given of oscillatory wind pressure forces (lift and drag) around rigid cylinders and flexible shells measured in the 43 x 30 in low speed wind tunnel, using three low pressure transducers and covering the range of Reynolds number from 0.4 to 2.85 x 100.000. The statistical methods available for the response of thin cylindrical shells to aerodynamic excitation are also considered. The statement of the present problem and methods of analysis are briefly described. ESRO

N75-29481# Loughborough Univ. of Technology (England). Dept. of Transport Technology.
RESPONSE OF THIN-WALLED CYLINDERS TO AERODYNAMIC EXCITATION, PART 2
D. J. Johns and R. Nataraja Nov. 1974 189 p refs 2 Vol.
(Contract SN/1170/010/NPL)
(TT-7413-Pt-2) Avail: NTIS HC $7.00

A comprehensive review of the literature in the thin shell theory is presented including a detailed discussion of nonlinear effects. Topics discussed in the appendices include: strain displacement relations for a general shell, general expression for the work potential, clamped-free beam functions, evaluation of integrals, static stability considerations, influence of structural damping, digital spectral analysis techniques, calibration of pressure transducers, error analysis, ground wind distribution, computer programs, structural design of steel chimneys, and statistics of random processes. Author (ESRO)

N75-29482# Hatfield Polytechnic (England).
THE EFFECT OF MEAN STRESS ON THE FATIGUE OF ALUMINUM ALLOYS
J. Gott London Min. of Defence 1974 107 p refs
(Contract MIN-DEF/PE-AT/2161/01/STR)
(S/T-Memo-9/74; BR34131) Avail: NTIS HC $5.25

Fatigue tests were performed on notched specimens of three precipitation hardened aluminum alloys under constant amplitude loading. The fatigue characteristics were obtained over a range of mean stress values which include tensile and compressive levels; comparisons were made between the three alloys and between the two notch factors used in the tests. Correlation was obtained between alternating stress and the numbers of fatigue nuclei and evidence of two types of fatigue failure at certain stress levels is identified. A useful method of presenting data at different mean stress values is introduced. Author (ESRO)

N75-29483# Royal Aircraft Establishment, Farnborough (England). Structures Dept.
A SHORT STUDY OF THE EFFECT OF A PENETRANT OIL ON THE FATIGUE LIFE OF A RIVETED JOINT
P. H. ONeill and R. J. Smith London Aeron. Res. Council 1975 12 p Supersedes RAE-TR-73174; ARC-35284
(ARC-CP-1305; RAE-TR-73174; ARC-35284) Avail: NTIS HC $3.25; HMSO 32P; PHI $1.45

Laboratory fatigue tests on riveted joints, half of which had been impregnated with a water-displacing, oil-based penetrant which is commonly being used in airline service to combat corrosion are described. The results showed that the lives of the treated specimens were significantly shorter than those of the untreated specimens. Further work, however, would be necessary to determine the effect of the penetrant under more realistic conditions over a longer time. Author (ESRO)

N75-29484# National Gas Turbine Establishment, Pyestock (England).
DEFORMATION AND FAILURE UNDER MULTIAXIAL STRESSES: A SURVEY OF LABORATORY TECHNIQUES AND EXPERIMENTAL DATA
W. J. Evans London Aeron. Res. Council 1974 53 p refs Supersedes NGTE-NT-833; ARC-33753
(ARC-CP-1306; NGTE-NT-833; ARC-33753) Avail: NTIS HC $4.25; HMSO £1.20; PHI $4.90

A survey of techniques for producing multiaxial stress conditions on a laboratory scale is presented and it is concluded that one of the more suitable systems is combined tension-torsion of thin-walled tubes. Experimentally this technique appears to offer several advantages: the shear/normal stress ratio can be conveniently controlled, thus enabling deformation and fracture mechanisms under multiaxial stresses to be studied. A review of relevant experimental work, most of which has been concerned with assessment of the various deformation and failure criteria is also given. Although there is some correlation for yield data, ductile or brittle fracture and creep behavior, the situation is not nearly so well defined for fatigue. Finally, work on the micro-structural effects of biaxial stresses is discussed. Author (ESRO)

N75-29485# Royal Aircraft Establishment, Farnborough (England). Structures Dept.
FATIGUE CRACK PROPAGATION IN THIN SHEETS OF L73 UNDER CONSTANT STRAIN AMPLITUDE
P. H. ONeill London Aeron. Res. Council 1975 30 p refs Supersedes RAE-TR-74042; ARC-35433
(ARC-CP-1314; RAE-TR-74042; ARC-35433) Avail: NTIS HC $3.75; HMSO 70P; PHI $2.95

Data covering the growth of a crack in small thin sheets of aluminum alloy (L73) tested under constant strain amplitude were analyzed. The results confirm that the crack propagation behavior was determined by the stress intensity factor range delta K, the critical stress intensity factor for fracture K sub c, and the stress ratio R as in the more familiar case of a crack growing under constant load amplitude. In the constant strain case allowance must be made, in calculating the stress, for the fall off in load due to the diminishing axial stiffness of the specimen as the crack length increases. A formula for calculating the axial stiffness of a centrally cracked sheet is derived. Author (ESRO)

N75-29486# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik der Luft- und Raumfahrtkonstruktionen.
AN INCORE FINITE ELEMENT PROGRAM FOR RESEARCH AND TEACHING PURPOSES
Luis L. Prieto 1974 158 p refs Sponsored by Deut. Akad. Austauschdienst
(ISD-162) Avail: NTIS HC $6.25

A FORTRAN computer program for the matrix analysis of structures is presented. A brief theoretical description of the matrix displacement method is given, and the development of a general program for the analysis of structures based on this method is considered. The force method as well as the displacement method are suited to matrix treatment, but the displacement method is more advantageous since it is applicable to all types of structures, including continuous systems. The discretization of the physical problem by means of finite elements results in a simplification of the mathematical problem and exact solutions. The computer program and its use are described together with all the subroutines and available element types. Examples are given of applications to three-dimensional trusses and frames, a two-dimensional membrane, a plane rigid frame with a pin-jointed bar, and a mixed plane structure with beams and tensors. ESRO

N75-29487# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
THE THICKNESS EFFECT IN PLANE STRESS FRACTURE TOUGHNESS

D. Broek and H. Vlieger Oct. 1973 76 p refs Sponsored by Neth. Agency for Aerospace Programs
(NLR-TR-74032-U) Avail: NTIS HC $4.75

Residual strength tests were conducted on center cracked aluminum alloy panels of various thicknesses. Slow crack growth, crack opening displacements, and compliances were recorded. Residual strength behavior, thickness effect, R-curves, longitudinal displacement of neck edges and compliance measurements are discussed. Author (ESRO)

N75-29488# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
FLIGHT-SIMULATION TESTS ON NOTCHED ELEMENTS
J. Schijve, F. A. Jacobs, and P. J. Tromp Feb. 1974 67 p refs Sponsored by Neth. Agency for Aerospace Programs
(NLR-TR-74033-U) Avail: NTIS HC $4.25

Fatigue tests were conducted on open-hole specimens, lugs, and riveted strap joints under flight simulation conditions. The effects of design stress level, truncating high amplitude gust loads, and omitting low amplitude gust cycles were studied. Observations of the open-hole specimens include data on crack initiation, crack closure, and damage increments. Constant-amplitude tests were carried out on the lugs, and damage calculations were made. Discussion of the results includes an analysis of the trends observed and the significance of the data for aeronautical applications. Author (ESRO)

N75-29489# Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.
MODE INTERACTION WITH STIFFENED PANELS
A. VanDerNeut May 1974 17 p refs
(VTH-180) Avail: NTIS HC $3.25

A column model is discussed which consists of two equal flanges, and is extremely sensitive to imperfection. Actual panel structures are unsymmetrical: the plate side has more cross section than the topside of the stiffeners, and the plate side is more affected by local buckling than the topside. This effect is exaggeratedly represented in a model in which the stiffeners do not participate in local buckling. It appears that the sensitivity to imperfections of this model is little and is restricted to geometric parameters R in the near vicinity of R = 1. These two models represent extreme cases. The position of actual tophat stiffened panels between these extremes is discussed; it appears that mode interaction is less severe than with the two flange model though still significant. Author (ESRO)

N75-29490# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
THE INCREMENTAL SOLUTION OF SOME BASIC PROBLEMS IN ELASTIC STABILITY
E. Riks Dec. 1973 116 p refs
(NLR-TR-74005-U) Avail: NTIS HC $5.25

A numerical solution is presented of the stability analysis of purely elastic structures under conservative loading conditions, revolving around computations of critical equilibrium states and the determination of the post critical-response. Governing equations of equilibrium are assumed to be a system of ordinary, nonlinear equations of a set of discrete variables that, with suitable modifications, can be solved with Newton's iterative method. The numerical continuation through snapping and bifurcation points and the continuation onto a branch of a bifurcation point are discussed. A finite element formulation of a shallow circular under a uniformly distributed load is taken as a model to verify the usefulness of the procedures proposed. The results of these computations are presented, together with some applications. ESRO

N75-29491# Watervliet Arsenal, N.Y.
FORCED EXTENSIONAL VIBRATIONS OF PLATES
Charles R. Thomas May 1971 29 p refs
(DA Proj. 1T0-61191-A-91A)
(AD-A006150; WVT-7135) Avail: NTIS CSCL 20/11

The forced extensional vibrations of plates is investigated within the framework of the Kane-Mindlin theory for the high frequency extensional vibrations of isotropic elastic plates. The solution to problems with time dependent surface and boundary conditions is determined according to Williams method. The resulting equations are applied to the forced extensional vibrations of infinite plate strips with clamped edge conditions. Numerical results for a shear loading are presented. GRA

N75-29492# National Bureau of Standards, Washington, D.C. Center for Building Technology.
NATURAL HAZARDS EVALUATION OF EXISTING BUILDINGS Final Report, Jun. 1972 - Jan. 1974
Charles G. Culver, H. S. Lew, Gary C. Hart (Wiggins (J.H.) Co, Redondo Beach, Calif.), and Clarkson W. Pinkham (Barnes (S. B.) and Associates, Los Angeles, Calif.) Jan. 1975 959 p refs Sponsored in part by Defense Dept., Washington, D.C.
(COM-75-10473/7; NBS-BSS-61; LC-74-28136) Avail: NTIS HC; SOD HC AS C13.29:2161

A methodology is presented for survey and evaluation of existing buildings to determine the risk to life safety under natural hazard conditions and estimate the mount of expected damage. Damage to both structural and nonstructural building components resulting from the extreme natural environments encountered in earthquakes, hurricanes, and tornadoes is considered. The methodology has the capability of treating a large class of structural types including braced and unbraced steel frames, concrete frames with and without shear walls, bearing wall structures, and long-span roof structures. Three independent but related sets of procedures for estimating damage for each of the natural hazards are included in the methodology. GRA

N75-29493# Tel-Aviv Univ. (Israel). School of Engineering.
FAILURE MODES OF ANGLE PLY LAMINATES
Assa Roten (Technion - Israel Inst. of Tech., Haifa) and Zvi Hashin Dec. 1974 27 p refs Prepared in cooperation with Technion - Israel Inst. of Tech., Haifa
(Grant AF-AFOSR-2591-74; AF Proj. 9782)
(AD-A005737; TAU-SOE-141/74; SR-1; AFOSR-75-0328TR) Avail: NTIS CSCL 11/4

Experimental investigation of failure of balanced angle-ply laminates under symmetric uniaxial tension revealed three distinct failure modes. The three different modes were observed for reinforcement angles smaller than plus or minus 45 degrees, for the plus or minus 45 degrees angle ply and for angles larger than plus or minus 45 degrees. Comparison of experimental failure loads with theoretical failure loads based on first lamina failure criteria showed good agreement for certain ranges for reinforcement angle and disagreement for others. GRA

N75-29494# Army Construction Engineering Research Lab., Champaign, Ill.
LOAD DEFLECTION BEHAVIOR OF LIME STABILIZED LAYERS Final Report
L. P. Suddath and M. R. Thompson Jan. 1975 60 p refs
(DA Proj. 4A6-64717-D-895)
(AD-A006015; CERL-TR-M-118) Avail: NTIS CSCL 13/2

The static and dynamic load-deflection response of soil-lime pavement layers was investigated. Soil-lime mixture layers 6, 9, and 12 in. thick were compacted over a stiff subgrade (k = 450 psi/in.) and a soft subgrade (k = 50 psi/in.). The soil-lime layers were statically and dynamically loaded after curing periods of 2, 14, 28, and 56 days. Supplemental subgrade soil and soil-lime mixture property data were also developed. The load-deflection data are summarized and analyzed. Various pavement behavior theories are evaluated to determine their capability to predict the load-deflection behavior of soil-lime pavement layers. Author

N75-29495# Texas Univ., Austin. Center for Highway Research.
THE BEHAVIOR OF AN AXIALLY LOADED DRILLED SHAFT UNDER SUSTAINED LOADING Interim Report
John A. Wooley and Lymon C. Reese May 1974 159 p refs Prepared in cooperation with Texas Highway Dept.
(PB-240328/5; CFHR-3-5-72-176-2) Avail: NTIS HC $6.25 CSCL 13B

Long-term phenomena of creep and consolidation are considered. From a literary research, it was found that creep can have the eventual effect of load shedding, a transfer of load to the lower regions of the shaft. This phenomenon, it is believed, can have the effect of increasing settlement. From field observations and measurements taken during the course of loading, it was found that little load shedding had occurred. It

is believed that this is a result of the relatively low stress levels in the soil compared to its capacity. GRA

N75-29496# Air Force Civil Engineering Center, Tyndall AFB, Fla.
A COMPUTER PROGRAM FOR RIGID PAVEMENT EVALUATION Final Report, Jun. 1971 - Dec. 1974
Floyd P. McClellen Jan. 1975 41 p refs
(AD-A006140; AFCEC-TR-74-7) Avail: NTIS CSCL 01/5

This document presents a computer program which computes Allowable Gross Loads (AGL's) for various aircraft wheel configurations on rigid airfield pavements. Full program documentation, including flow charts, program listing, and sample output are included. GRA

N75-29497# Bell Aerospace Co., Buffalo, N.Y.
OPTIM 2: A MAGIC COMPATIBLE LARGE SCALE AUTOMATED, MINUMUM WEIGHT DESIGN PROGRAM. VOLUME 2: PROGRAMMERS MANUAL Final Report, Jun. 1972 - Apr. 1974
Stephen C. Skalski Jul. 1974 93 p refs
(Contract F33615-72-C-1351; AF Proj. 1467)
(AD-A006412; D2459-9500001-Vol-2; AFFDL-TR-74-97-Vol-2) Avail: NTIS CSCL 13/13

An automated minimum weight design program is presented. This program called OPTIM 2 provides a flexible framework for implementation of finite element technology in minimum weight design. Capabilities for displacement, stress and buckling analyses are included in the program. Eight finite elements are incorporated in the finite element library. These are: axial, shear web, triangular plate, quadrilateral plate, tubular beam, axial with mid-point node, triangular plate with midpoint nodes and quadrilateral plate element with mid-point nodes. These finite element representations include matrices for stiffness and stresses. GRA

N75-29498# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE QUESTION OF STATIC COMPUTATION OF SADDLE-SHAPPED SUSPENDED COVERINGS ACCORDING TO A DISCRETE DIAGRAM
V. R. Kulbadh 26 Nov. 1974 16 p refs Transl. into ENGLISH from Tr. Tallinsk. Politekhn. Inst., Ser. A. Sbornik Statey, Tallin (USSR), no. 314, 1971 p 19-28
(AD-A005997; FTD-MT-24-2630-74) Avail: NTIS CSCL 20/11

The general nonlinear equations for the calculation of forces and displacement of discrete cable-network are given. Some considerations on the solution of these equations are presented. Further the network with vertical plane cables is examined. For the solution of the equation system in this case the method of natural iteration is recommended. This method is applicable for the calculation of forces and displacements of the network by means of electronic computer. GRA

N75-29499# Army Foreign Science and Technology Center, Charlottesville, Va.
DYNAMIC METHOD OF INVESTIGATING THE STABILITY OF A COMPRESSED ROD
K. S. Deineko and M. Ya. Leonov 27 Aug. 1974 13 p ref Transl. into ENGLISH from Prikl. Mat. Mekh. (USSR), v. 19, no. 6, 1955 p 738-744
(AD-A005965; FSTC-HT-23-845-74) Avail: NTIS CSCL 20/11

Using the partial differential equation describing the vibration of a rod compressed by an axial force, the author obtains expressions for the critical force in the case of a rod fixed at one end and loaded at the other end by a follow-up force along the tangent to its axis, when the compressive forces acting on the rod are nonconservative. The author also obtains an approximate expression for the critical force based on a simplified version of the frequency equation with an approximate error of 2%. GRA

N75-29500# Illinois Univ., Urbana. Dept. of Civil Engineering.
FATIGUE BEHAVIOR OF WELDED REINFORCEMENT IN REINFORCED CONCRETE BEAMS Interim Report, Jul. 1969 - Jun. 1973
M. R. Barone, J. P. Cannon, and W. H. Munse May 1974 173 p refs Sponsored by Federal Highway Admin.
(PB-240367/3; UILU-ENG-74-2006; Ser-149) Avail: NTIS HC $6.25 CSCL 13C

Fatigue tests were conducted on reinforcing bars subjected to axial loadings and reinforcing bars embedded in concrete beams. Major emphasis was placed on determining the effect of both welding and type of bar material on the fatigue behavior of the beam reinforcement. To this end a variety of butt and lap-welded joint types were studied. The relative fatigue behavior of intermediate grade and high strength reinforcing bars was investigated. GRA

N75-29273 Columbia Univ., New York.
DYNAMIC RESPONSE OF FLUID-FILLED SHELLS
F. L. DiMaggio *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 7, No. 5 May 1975 p 5-12 refs (For availability see N75-29272 20-31)

42 GEOSCIENCES (GENERAL)

N75-29501# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
GEOPHYSICS AND SPACE DATA BULLETIN. VOLUME 11, NO. 3, THIRD QUARTER 1974
Anne L. Carrigan Dec. 1974 276 p
(AD-A006402; AFCRL-SR-186; APCRL-TR-74-0608) Avail: NTIS CSCL 03/2

This Bulletin is a quarterly publication that contains AFCRL contract and inhouse data reported from sites throughout the world. The following types of data are contained within each issue: magnetometer, cosmic ray, ELF noise, riometer, solar optical and radio emission, and ionosonde. This issue covers such data for July, August, and September 1974. GRA

N75-29502# Battelle-Northwest, Richland, Wash.
ECOLOGICAL CHARACTERISTICS OF THE BOARDMAN SITE AND ENVIRONS, MORROW COUNTY, OREGON Final Report, Mar. 1975
L. E. Rogers, J. M. Gurtisen, W. H. Rickard, and R. E. Fitzner Mar. 1975 149 p refs Prepared in cooperation with Portland GE Co., Oreg. Sponsored by ERDA
(PB-241071/0; PGE-2007) Avail: NTIS HC $5.75 CSCL 06F

Data are provided concerning biota, other than man, and its relationship to the existing climatic regime and land use history at the Boardman Site, a large undeveloped tract of steppe land in northern Morrow County, Oregon. Baseline information is presented to permit evaluation of anticipated changes in plant and animal population related to the construction and operation of one or more electrical power generating stations and construction of a large water storage resevoir. GRA

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N75-29503*# Northern Prairie Wildlife Research Center, Jamestown, N. Dak.
UTILIZATION OF SKYLAB (EREP) SYSTEM FOR APPRAISING CHANGES IN CONTINENTAL MIGRATORY BIRD HABITAT Monthly Progress Report
David S. Gilmer, Principal Investigator Jul. 1975 3 p EREP
(NASA Order T-4114-B; Contract DI-14-16-0008-802)
(E75-10361; NASA-CR-143219) Avail: NTIS HC $3.25 CSCL 06C

There are no author-identified significant results in this report.

N75-29504*# Pennsylvania State Univ., University Park. Office of Remote Sensing of Earth Resources.
PROCESSING ERTS AND AIRCRAFT MSS DATA WITH THE GENERAL ELECTRIC IMAGE 100 SYSTEM Interim Report
George J. McMurtry, Gary W. Petersen, Principal Investigators, B. F. Merembeck, and F. Y. Borden Jun. 1975 8 p ERTS
(Contract NAS5-23133)
(E75-10362; NASA-CR-143220; ORSER-SSEL-TR-4-75) Avail: NTIS HC $3.25 CSCL 05B

There are no author-identified significant results in this report.

N75-29505*# Michigan State Univ., East Lansing.
INVESTIGATION OF SKYLAB DATA Progress Report
Lester V. Manderscheid, Principal Investigator Jun. 1975 1 p EREP
(Contract NAS9-13332)
(E75-10363; NASA-CR-143221) Avail: NTIS HC $3.25 CSCL 05B

There are no author-identified significant results in this report.

N75-29506*# Pennsylvania Univ., Philadelphia. Museum Applied Science Center for Archaeology.
DETECTION OF CROP MARK CONTRAST FOR ARCHAEOLOGICAL SURVEYS Quarterly Progress Report
Bruce Bevan, Principal Investigator 8 Jul. 1975 4 p ERTS
(Contract NAS5-20792)
(E75-10364; NASA-CR-143222; QPR-2) Avail: NTIS HC $3.25 CSCL 08F

There are no author-identified significant results in this report.

N75-29507*# Ohio Dept. of Economic and Community Development, Columbus.
OHIO SKYLAB EREP INVESTIGATION Progress Report
Paul Baldridge, Principal Investigator 30 Jun. 1975 7 p EREP
(Contract NAS3-19521)
(E75-10365; NASA-CR-143223) Avail: NTIS HC $3.25 CSCL 05B

There are no author-identified significant results in this report.

N75-29508*# Environmental Research Inst. of Michigan, Ann Arbor.
[RECOGNITION MAP ANALYSIS AND CROP ACREAGE ESTIMATION USING SKYLAB EREP DATA] Progress Report, Feb. 1975
Lester V. Manderscheid (Michigan State Univ.), Jon D. Erickson, Principal Investigators, Richard F. Nalepka, and James P. Morgenstern 20 Mar. 1975 2 p EREP
(Contract NAS9-13332)
(E75-10366; NASA-CR-143224; ERIM-104600-34-L) Avail: NTIS HC $3.25 CSCL 05B

There are no author-identified significant results in this report.

N75-29509*# Alaska Univ., Fairbanks.
USE OF LANDSAT IMAGERY FOR WILDLIFE HABITAT MAPPING IN NORTHEAST AND EAST CENTRAL ALASKA Progress Report
Peter C. Lent, Principal Investigator and Arthur J. LaPerriere 1 Aug. 1975 4 p ERTS
(Contract NAS5-20915)
(E75-10367; NASA-CR-143225) Avail: NTIS HC $3.25 CSCL 06C

There are no author-identified significant results in this report.

N75-29510*# Pennsylvania State Univ., University Park. Office for Remote Sensing of Earth Resources.
SATELLITE DETECTION OF VEGETATIVE DAMAGE AND ALTERATION CAUSED BY POLLUTANTS EMITTED BY A ZINC SMELTER Interim Report
George J. McMurtry, Gary W. Petersen, Principal Investigators, E. L. Fritz, and S. P. Pennypacker Nov. 1974 16 p refs Presented at the 66th Ann. Meeting of the Phytopathological Soc. and the 40th Sess. of the Can. Phytopathological Soc., Vancouver, B. C., 11-15 Aug. 1974 ERTS
(Contract NAS5-23133)
(E75-10368; NASA-CR-143226; ORSER-SSEL-TR-19-74) Avail: NTIS HC $3.25 CSCL 13B

The author has identified the following significant results. Field observations and data collected by low flying aircraft were used to verify the accuracy of maps produced from the satellite data. Although areas of vegetation as small as six acres can accurately be detected, a white pine stand that was severely damaged by sulfur dioxide could not be differentiated from a healthy white pine stand because spectral differences were not large enough. When winter data were used to eliminate interference from herbaceous and deciduous vegetation, the damage was still undetectable. The analysis was able to produce a character map that accurately delineated areas of vegetative alteration due to high zinc levels accumulating in the soil. The map depicted a distinct gradient of less damage and alteration as the distance from the smelter increased. Although the satellite data will probably not be useful for detecting small acreages of damaged vegetation, it is concluded that the data may be very useful as an inventory tool to detect and delineate large vegetative areas possessing differing spectral signatures.

N75-29511*# Environmental Research Inst. of Michigan, Ann Arbor.
[RECOGNITION MAP ANALYSIS AND CROP ACREAGE ESTIMATION USING SKYLAB EREP DATA] Progress Report, Mar. 1975
Lester V. Manderscheid (Michigan State Univ., East Lansing), Jon D. Erickson, Principal Investigators, Richard F. Nalepka, and James P. Morgenstern 21 Apr. 1975 7 p ref EREP
(Contract NAS9-13332)
(E75-10369; NASA-CR-143227; ERIM-104600-36-L) Avail: NTIS HC $3.25 CSCL 05B

There are no author-identified significant results in this report.

N75-29512*# Saint Lawrence Univ., Canton, N.Y. Dept. of Geology and Geography.
INVESTIGATION OF RELATIONSHIPS BETWEEN LINEARS, TONAL AND HAZY ANOMALIES, AND PETROLEUM PRODUCTION IN THE WILLISTON BASIN: AN ERTS APPROACH Semiannual Status Report, Nov. 1974 - Apr. 1975
J. Mark Erickson, James S. Street, Principal Investigators, Cynthia J. Munsell, and Douglas E. Brien Apr. 1975 7 p ERTS
(Grant NsG-5018)
(E75-10370; NASA-CR-143228) Avail: NTIS HC $3.25 CSCL 08B

There are no author-identified significant results in this report.

N75-29513*# Bethune-Cookman Coll., Daytona Beach, Fla.
REMOTE SENSING OVER NORTH MERRITT ISLAND Semiannual Report, Nov. 1974 - Apr. 1975
Premsukh Poonai, Principal Investigator Apr. 1975 15 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 ERTS
(Grant NGR-10-022-001)
(E75-10371; NASA-CR-143229) Avail: NTIS HC $3.25 CSCL 08B

The author has identified the following significant results. For monitoring the surface environment of North Merritt Island, two methods are studied, namely, color infrared photography and machine processing of LANDSAT multispectral scanner data. C.I.R. photos made at a height of about 12,000 ft were found to define the borders of ground features around the space shuttle runway with a nonsignificant mean error of 0.138 meters but a wide range, which can be reduced with photos taken at about 6,000 ft. LANDSAT multispectral scanner data, transformed by use of the function f(g) = g1 + g2 -g3 -g4 where g1, g2, g3, and g4 represent reflectance or grey levels of multispectral

channels 1,2,3, and 4, gave values which are classifiable into a relatively small number of categories.

N75-29514*# Mississippi State Univ., State College.
APPLICATION OF REMOTE SENSING TO STATE AND REGIONAL PROBLEMS Semiannual Progress Report, 1 Nov. 1974 - 30 Apr. 1975
C. W. Bouchillon, Principal Investigator, W. Frank Miller, Jerry C. Harris, Bradley Carter, Frank D. Whisler, H. Randell Robinette, and Vic L. Zitta 30 Apr. 1975 43 p refs ERTS
(Contract NAS5-21881; Grant NGL-25-001-054)
(E75-10372; NASA-CR-143230; SAPR-3) Avail: NTIS HC $3.75 CSCL 05B

There are no author-identified significant results in this report.

N75-29515*# Ohio Dept. of Economic and Community Development, Columbus.
OHIO SKYLAB EREP INVESTIGATION Progress Report, Apr. - May 1975
Paul Baldridge, Principal Investigator 29 May 1975 9 p EREP
(Contract NAS3-19521)
(E75-10373; NASA-CR-143232) Avail: NTIS HC $3.25 CSCL 08B

There are no author-identified significant results in this report.

N75-29516*# Federation of Rocky Mountain States, Inc., Denver, Colo.
A REGIONAL LAND USE SURVEY BASED ON REMOTE SENSING AND OTHER DATA Quarterly Report, 10 Apr. - 10 Jul. 1975
George Nez, Principal Investigator 10 Jul. 1975 24 p ERTS
(Contract NAS5-22338)
(E75-10374; NASA-CR-143233) Avail: NTIS HC $3.25 CSCL 08B

There are no author-identified significant results in this report.

N75-29517*# Environmental Research Inst. of Michigan, Ann Arbor.
[RECOGNITION MAP ANALYSIS AND CROP ACREAGE ESTIMATION] Progress Report, Apr. 1975
Lester V. Manderscheid (Michigan State Univ., East Lansing), Jon D. Erickson, Principal Investigators, Richard F. Nalepka, and James P. Morgenstern 27 May 1975 5 p EREP
(Contract NAS9-13332)
(E75-10375; NASA-CR-143234; ERIM-104600-38-L) Avail: NTIS HC $3.25 CSCL 05B

There are no author-identified significant results in this report.

N75-29518*# Environmental Research Inst. of Michigan, Ann Arbor.
[RECOGNITION MAP ANALYSIS AND CROP ACREAGE ESTIMATION] Progress Report, May 1975
Lester V. Manderscheid (Michigan State Univ., East Lansing), Jon D. Erickson, Principal Investigators, Richard F. Nalepka, and James P. Morgenstern 10 Jun. 1975 7 p EREP
(Contract NAS9-13332)
(E75-10376; NASA-CR-143238; ERIM-104600-40-L) Avail: NTIS HC $3.25 CSCL 05B

There are no author-identified significant results in this report.

N75-29519*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
STUDY OF THE UTILIZATION OF EREP DATA FROM THE WABASH RIVER BASIN Monthly Report
LeRoy F. Silva, Principal Investigator Jun. 1975 2 p EREP
(Contract NAS9-13301)
(E75-10377; NASA-CR-143239) Avail: NTIS HC $3.25 CSCL 08H

There are no author-identified significant results in this report.

N75-29520*# Corps of Engineers, Waltham, Mass.
THE USE OF LANDSAT DCS AND IMAGERY IN RESERVOIR MANAGEMENT AND OPERATION Progress Report, 1 Jun. 1975
Saul Cooper, Principal Investigator 1 Jun. 1975 58 p refs Sponsored by NASA Original contains color illustrations ERTS
(E75-10378; NASA-CR-143240; PR-1) Avail: NTIS HC $4.25 CSCL 08H

There are no author-identified significant results in this report.

N75-29521*# California Earth Science Corp., Santa Monica.
FAULTS ON SKYLAB IMAGERY OF THE SALTON TROUGH AREA, SOUTHERN CALIFORNIA
P. M. Merifield and D. L. Lamar, Principal Investigators Jun. 1975 25 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 EREP
(Contract NAS2-7698)
(E75-10379; NASA-CR-141918; TR-75-1) Avail: NTIS HC $3.25 CSCL 08G

The author has identified the following significant results. Large segments of the major high angle faults in the Salton Trough area are readily identifiable in Skylab images. Along active faults, distinctive topographic features such as scarps and offset drainage, and vegetation differences due to ground water blockage in alluvium are visible. Other fault-controlled features along inactive as well as active faults visible in Skylab photography include straight mountain fronts, linear valleys, and lithologic differences producing contrasting tone, color or texture. A northwestern extension of a fault in the San Andreas set, is postulated by the regional alignment of possible fault-controlled features. The suspected fault is covered by Holocene deposits, principally windblown sand. A northwest trending tonal change in cultivated fields across Mexicali Valley is visible on Skylab photos. Surface evidence for faulting was not observed; however, the linear may be caused by differences in soil conditions along an extension of a segment of the San Jacinto fault zone. No evidence of faulting could be found along linears which appear as possible extensions of the Substation and Victory Pass faults, demonstrating that the interpretation of linears as faults in small scale photography must be corroborated by field investigations.

N75-29522*# Environmental Research Inst. of Michigan, Ann Arbor.
[RECOGNITION MAP ANALYSIS AND CROP ACREAGE ESTIMATION] Progress Report, Jun. 1975
Lester V. Manderscheid (Michigan State Univ., East Lansing), Jon D. Erickson, Principal Investigators, Richard F. Nalepka, and James P. Morgenstern 16 Jul. 1975 5 p EREP
(Contract NAS9-13332)
(E75-10380; NASA-CR-143242; ERIM-104600-42-L) Avail: NTIS HC $3.25 CSCL 05B

There are no author-identified significant results in this report.

N75-29523*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.
OIL-POLLUTION DETECTION AND MONITORING FROM SPACE USING ERTS-1 Final Report, 12 Jun. 1972 - 30 Nov. 1974
Robert Horvath and Gary C. Goldman, Principal Investigators Jul. 1975 57 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 ERTS
(Contract NAS5-21783)
(E75-10381; NASA-CR-143243; ERIM-193300-68-F) Avail: NTIS HC $4.25 CSCL 13B

The author has identified the following significant results. Three reported spills were investigated using four digital computer, compatible techniques on ERTS - 1 data. A spill on the Atlantic Ocean (off Virginia) was studied to develop spectral signatures. Another spill, in Oakland Bay, was studied by ratioing spectral channels (to try to eliminate turbidity effects) and by summing different spectral channels to look for anomolus values caused by oil. The final spill, off Southern California, was investigated by looking for anomolus values in each channel separately. Results indicate that any of these methods might be usable if the spill

is large enough to be seen by satellite, if the spill occurs more than a few kilometers off shore, and if the sky and water are relatively clear. In the case of the Atlantic spill, identification of material was not possible; and in the other two cases, the spills could not be detected at all. ERTS-1 was not considered feasible for this type of work because of its 18 day overpass frequency, the few spectral channels, the extended bandwidths, and the long, information retrieval time.

N75-29524*# Earth Satellite Corp., Berkeley, Calif.
A SCHEME FOR THE UNIFORM MAPPING AND MONITORING OF EARTH RESOURCES AND ENVIRONMENTAL COMPLEXES: AN ASSESSMENT OF NATURAL VEGETATION, ENVIRONMENTAL, AND CROP ANALOGS Final Report
Charles E. Poulton and Robin I. Welch, Principal Investigators Jul. 1975 280 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 ERTS
(Contract NAS5-21830)
(E75-10382; NASA-CR-143244; G-072) Avail: NTIS HC $8.75 CSCL 08B

The author has identified the following significant results. A study was performed to develop and test a procedure for the uniform mapping and monitoring of natural ecosystems in the semi-arid and wood regions of the Sierra-Lahontan and Colorado Plateau areas, and for the estimating of rice crop production in the Northern Great Valley (Ca.) and the Louisiana Coastal Plain. ERTS-1 and high flight and low flight aerial photos were used in a visual photointerpretation scheme to identify vegetation complexes, map acreages, and evaluate crop vigor and stress. Results indicated that the vegetation analog concept is valid; that depending on the kind of vegetation and its density, analogs are interpretable at different levels in the hierarchical classification from second to the fourth level. The second level uses physiognomic growth form-structural criteria, and the fourth level uses floristic or taxonomic criteria, usually at generic level. It is recommended that analog comparisons should be made in relatively small test areas where large homogeneous examples can be found of each analog.

N75-29525*# Alaska Univ., Fairbanks. Inst. of Arctic Biology.
LAND USE MAPS OF THE TANANA AND PURCELL MOUNTAIN AREAS, ALASKA, BASED ON EARTH RESOURCES TECHNOLOGY SATELLITE IMAGERY Interim Report, Sep. - Dec. 1974
J. H. Anderson, Principal Investigator 13 Dec. 1974 20 p refs ERTS
(Contract NAS5-21833)
(E75-10383; NASA-CR-143245) Avail: NTIS HC $3.25 CSCL 08B

The author has identified the following significant results. ERTS imagery in photographic format was used to make land use maps of two areas of special interest to native corporations under terms of the Alaska Native Claims Settlement Act. Land selections are to be made in these areas, and the maps should facilitate decisions because of their comprehensive presentation of resource distribution information. The ERTS images enabled mapping broadly-defined land use classes in large areas in a comparatively short time. Some aerial photography was used to identify colors and shades of gray on the various images. The 14 mapped land use categories are identified according to the classification system under development by the U.S. Geological Survey. These maps exemplify a series of about a dozen diverse Alaskan areas. The principal resource depicted is vegetation, and clearly shown are vegetation units of special importance, including stands possibly containing trees of commercial grade and stands constituting wildlife habitat.

N75-29526*# Saint Lawrence Univ., Canton, N.Y. Dept. of Geology and Geography.
INVESTIGATION OF RELATIONSHIPS BETWEEN LINEARS, TOTAL AND HAZY AREAS, AND PETROLEUM PRODUCTION IN THE WILLISTON BASIN: AN ERTS APPROACH Final Report
J. Mark Erickson, James S. Street, Principal Investigators, Cynthia J. Munsell, and Douglas E. OBrien Aug. 1975 63 p refs ERTS
(Grant NsG-5018)
(E75-10384; NASA-CR-143246) Avail: NTIS HC $4.25 CSCL 08G

The author has identified the following significant results. ERTS-1 imagery in a variety of formats was used to locate linear, tonal, and hazy features and to relate them to areas of hydrocarbon production in the Williston Basin of North Dakota, eastern Montana, and northern South Dakota. Derivative maps of rectilinear, curvilinear, tonal, and hazy features were made using standard laboratory techniques. Mapping of rectilinears on both bands 5 and 7 over the entire region indicated the presence of a northeast-southwest and a northwest-southeast regional trend which is indicative of the bedrock fracture pattern in the basin. Curved lines generally bound areas of unique tone, maps of tonal patterns repeat many of the boundaries seen on curvilinear maps. Tones were best analyzed on spring and fall imagery in the Williston Basin. It is postulated that hazy areas are caused by atmospheric phenomena. The ability to use ERTS imagery as an exploration tool was examined where petroleum and gas are presently produced (Bottineau Field, Nesson and Antelope anticlines, Redwing Creek, and Cedar Creek anticline). It is determined that some tonal and linear features coincide with location of present production in Redwing and Cedar Creeks. In the remaining cases, targets could not be sufficiently well defined to justify this method.

N75-29527*# Purdue Univ., Lafayette, Ind.
THE APPLICATION OF REMOTE SENSING TECHNOLOGY TO THE SOLUTION OF PROBLEMS IN THE MANAGEMENT OF RESOURCES IN INDIANA Semiannual Status Report, 1 Dec. 1974 - 31 May 1975
D. A. Landgrebe 31 May 1975 14 p
(Grant NGL-15-005-186)
(NASA-CR-143317) Avail: NTIS HC $3.25 CSCL 08F

The use of satellite remote sensing for resources management was investigated in Indiana. The technique was applied to strip mining and reclamation, highway planning, and the detection of dolomite reefs. A data base was created and used to produce land characteristics and suitability maps for land use planning. In addition, a three dimensional model was developed which provides a cross-sectional profile of the thermal plumes emitted by point sources of thermal pollution into rivers and lakes; this model may be used for the design and site selection of electric power plants. D.M.L.

N75-29528*# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
THE DECISION TREE APPROACH TO CLASSIFICATION
Chialin Wu, David A. Landgrebe, and Philip H. Swain May 1975 198 p refs
(Contract NAS9-14016; Grant NGL-15-005-112)
(NASA-CR-141930; LARS-Inform-Note-090174; TR-EE-75-17) Avail: NTIS HC $7.00 CSCL 05B

A class of multistage decision tree classifiers is proposed and studied relative to the classification of multispectral remotely sensed data. The decision tree classifiers are shown to have the potential for improving both the classification accuracy and the computation efficiency. Dimensionality in pattern recognition is discussed and two theorems on the lower bound of logic computation for multiclass classification are derived. The automatic or optimization approach is emphasized. Experimental results on real data are reported, which clearly demonstrate the usefulness of decision tree classifiers. Author

N75-29529*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
BRINGING REMOTE SENSING TECHNOLOGY TO THE USER COMMUNITY
J. C. Lindenlaub, S. M. Davis, and D. B. Morrison 1975 18 p refs Presented at Earth Resources Survey Symp., Houston, Tex., Jun. 1975
(Contract NAS9-14016)
(NASA-CR-141931; LARS-IN-051975; T-1039/4) Avail: NTIS HC $3.75 CSCL 05B

The procedures and services available for educating and training potential users of remote sensing technology are discussed along with approaches for achieving an in-house capability for

the analysis of remotely sensed data using numerical techniques based on pattern recognition principles. Cost estimates are provided where appropriate. Author

N75-29530*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
INTERPOLATION OF ERTS-1 MULTISPECTRAL SCANNER DATA
C. D. McGillem 1975 21 p
(Contract NAS9-14016; Grant NGL-15-005-112)
(NASA-CR-141861; LARS-IN-022175) Avail: NTIS HC $3.25 CSCL 05B

Three interpolation procedures, based on computing values between original sample points, for enlarging a picture are examined. An ERTS frame of Washington, D.C. was used to illustrate the results. Mathematical bases of the interpolation are given. Author

N75-29531*# Martin Marietta Corp., Baltimore, Md.
GROUND TRUTH DATA FOR TEST SITES (SL-3)
29 Mar. 1974 142 p
(Contract NAS8-24000)
(NASA-CR-141911; MSC-05537) Avail: NTIS HC $5.75 CSCL 05B

Field measurements performed simultaneously with Skylab overpasses in order to provide comparative calibration and performance evaluation measurements for the EREP sensors are presented. The solar radiation region from 400 to 1300 nanometers and the thermal radiation region from 8 to 14 micrometer region were investigated. The measurements of direct solar radiation were analyzed for atmospheric optical depth; the total and reflected solar radiation were analyzed for target reflectivity. These analyses were used in conjunction with a radiative transfer computer program in order to calculate the amount and spectral distribution of solar radiation at the apertures of the EREP sensors. The instrumentation and techniques employed, calibrations and analyses performed, and results obtained are discussed. Author

N75-29532*# Martin Marietta Corp., Baltimore, Md.
GROUND TRUTH DATA FOR TEST SITES (SL-4)
30 Apr. 1974 81 p refs
(Contract NAS8-24000)
(NASA-CR-141912; MSC-05543) Avail: NTIS HC $4.75 CSCL 05B

Field measurements performed simultaneous with Skylab overpass in order to provide comparative calibration and performance evaluation measurements for the EREP sensors are presented. Wavelength region covered include: solar radiation (400 to 1300 nanometer), and thermal radiation (8 to 14 micrometer). Measurements consisted of general conditions and near surface meteorology, atmospheric temperature and humidity vs altitude, the thermal brightness temperature, total and diffuse solar radiation, direct solar radiation (subsequently analyzed for optical depth/transmittance), and target reflectivity/radiance. The particular instruments used are discussed along with analyses performed. Detailed instrument operation, calibrations, techniques, and errors are given. Author

N75-29533*# Joint Publications Research Service, Arlington, Va.
INFORMATION CONTENT OF THE DATA OBTAINED BY REMOTE SENSING OF THE PARAMETERS OF THE ENVIRONMENT AND THE EARTH'S RESOURCES FROM SPACE
K. Ya. Kondratyev, A. A. Grigoryev, and O. M. Pokrovskiy Washington NASA Aug. 1975 103 p refs Transl. into ENGLISH of the book "Informatsionnoye Soderzhaniye Dannykh Kosmicheskoy Distantsionnoy Indikatsii Parametrov Okruzhayushchey Sredy i Prirodnykh Resursov" Leningrad, Leningrad Univ. Press, 1975 p 1-146
(NASA-TT-F-16435) Avail: NTIS HC $5.25 CSCL 05B

The theory of information content of an experiment and the application of this theory to the problems of remote atmospheric sounding and the optimum choice of spectral intervals for multispectral surveying, are discussed. The main requirements for basic information on the earth's radiation field are listed (the areas of the spectrum providing the most information, the necessary spectral and spatial resolution, the required frequency of data production, and so forth) that are used to solve various problems in such areas as hydrology, oceanology, forestry and agriculture, and geology. Author

N75-29534*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
THE EFFECTS OF THE PHYSICAL AND CHEMICAL PROPERTIES OF SOILS ON THE SPECTRAL REFLECTANCE OF SOILS
O. L. Montgomery and M. F. Baumgardner 1974 119 p refs
(Contract NAS9-14016)
(NASA-CR-144379; LARS-IN-112674) Avail: NTIS HC $5.25 CSCL 08M

The effects of organic matter, free iron oxides, texture, moisture content, and cation exchange capacity on the spectral reflectance of soils were investigated along with techniques for differentiating soil orders by computer analysis of multispectral data. By collecting soil samples of benchmark soils from the different climatic regions within the United States and using the extended wavelength field spectroradiometer to obtain reflectance values and curves for each sample, average curves were constructed for each soil order. Results indicate that multispectral analysis may be a valuable tool for delineating and quantifying differences between soils. Author

N75-29535*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
STATION COORDINATES IN THE STANDARD EARTH 3 SYSTEM AND RADIATION-PRESSURE PERTURBATIONS FROM ISAGEX CAMERA DATA
E. M. Gaposchkin, J. Latimer, and G. Mendes Aug. 1975 52 p refs
(Grant NGR-09-015-002)
(NASA-CR-143315) Avail: NTIS HC $4.25 CSCL 08B

Simultaneous and individual camera observations of GEOS 1, GEOS 2, Pageos, and Midas 4 obtained during the International Satellite Geodesy Experiment are utilized to determine station coordinates. The Smithsonian Astrophysical Observatory Standard Earth III system of coordinates is used to tie the geometrical network to a geocentric system and as a reference for calculating satellite orbits. A solution for coordinates combining geometrical and dynamical methods is obtained, and a comparison between the solutions and terrestrial data is made. The radiation-pressure and earth-albedo perturbations for Pageos are very large, and Pageos' orbits are used to evaluate the analytical treatment of these perturbations. Residual effects, which are probably of interest to aeronomists, remain in the Pageos orbits. Author

N75-29536*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
CROP IDENTIFICATION TECHNOLOGY ASSESSMENT FOR REMOTE SENSING (CITARS). VOLUME 6: DATA PROCESSING AT THE LABORATORY FOR APPLICATIONS OF REMOTE SENSING
Marvin E. Bauer, Tina K. Cary, Barbara J. Davis, and Philip H. Swain Houston, Tex. NASA Jul. 1975 69 p refs
(Contract NAS9-14016)
(NASA-CR-144374; JSC-09389-Vol-6) Avail: NTIS HC $4.25 CSCL 02C

The results of classifications and experiments for the crop identification technology assessment for remote sensing are summarized. Using two analysis procedures, 15 data sets were classified. One procedure used class weights while the other assumed equal probabilities of occurrence for all classes. Additionally, 20 data sets were classified using training statistics from another segment or date. The classification and proportion estimation results of the local and nonlocal classifications are reported. Data also describe several other experiments to provide additional understanding of the results of the crop identification technology assessment for remote sensing. These experiments investigated alternative analysis procedures, training set selection and size, effects of multitemporal registration, spectral discriminability of corn, soybeans, and other, and analyses of aircraft multispectral data. Author

N75-29537# PRC Information Sciences Co., McLean, Va.
ACS BATCH PROCESSING SYSTEM. VOLUME 1: SYSTEM

DESIGN DOCUMENT Final Report, Aug. 1971 - Apr. 1974
Frederick C. Budelman, Gerald J. Graklanoff, and Paul R. Soderholm Oct. 1974 90 p
(Contract F30602-72-C-0019)
(AD-A005304; PRC-R-1706-Vol-1; RADC-TR-74-245-Vol-1) Avail: NTIS CSCL 08/2

The ACS Batch Processing System, System Design Document presents the results of the analysis of the batch processing programs which were extracted for use within the Batch Processing System (BPS) and a summary of the capabilities of the BPS system as it was implemented. GRA

N75-29538# PRC Information Sciences Co., McLean, Va.
ACS BATCH PROCESSING SYSTEM. VOLUME 2: USER'S GUIDE Final Report, Aug. 1971 - Apr. 1974
Frederick C. Budelman, Gerald J. Graklanoff, and Paul R. Soderholm Oct. 1974 106 p
(Contract F30602-72-C-0019)
(AD-A005305; PRC-R-1706-Vol-2; RADC-TR-74-245-Vol-2) Avail: NTIS CSCL 08/2

This functional specifications document presents final design specifications for the ACS Consolidated Batch Processing System. Each of the ACS batch processing requirements is separately addressed with respect to its control cards and callable options. GRA

N75-29539# PRC Information Sciences Co., McLean, Va.
ACS BATCH PROCESSING SYSTEM. VOLUME 3: SYSTEM AND FUNCTIONAL PROGRAM DESCRIPTION Final Report, Aug. 1971 - Apr. 1973
Frederick C. Budelman, Gerald J. Graklanoff, and Paul R. Soderholm Oct. 1974 316 p
(Contract F30602-72-C-0019)
(AD-A005306; PRC-R-1706-Vol-3; RADC-TR-74-245-Vol-3) Avail: NTIS CSCL 08/2

This program description document contains technical software descriptions of the ACS Consolidated Batch Processing System (BPS) programs. For each BPS system and functional module detailed input/output control and process data formats are presented therewith. GRA

N75-29540# North Carolina Univ., Chapel Hill. School of Law.
LEGAL ASPECTS OF PHOSPHATE MINING IN NORTH CAROLINA Sea Grant Publication
Michael A. Almond Feb. 1975 31 p
(Grant NOAA-04-3-158-40)
(COM-75-10504/9; UNC-SG-75-05; NOAA-75040401) Avail: NTIS HC $3.75 CSCL 05D

The removal of phosphate, critically needed to provide fertilizer to increase crop yields, from beneath navigable waters of North Carolina produces adverse effects upon marine life adjacent to the operation. Pertinent North Carolina statutes and legal thinking likely to be used in the administrative or legal solution of the problem are presented. It is indicated that flexible regulation may provide the only viable answers. GRA

N75-29541# Wilkes Coll., Wilkes-Barre, Pa.
REMOVAL OF MANGANESE FROM MINE DRAINAGE BY OZONE AND CHLORINE Final Report
Ralph B. Rozelle and Howard A. Swain, Jr. Mar. 1975 57 p refs
(Contract EPA-R-801236)
(PB-241143/7; EPA-670/2-75-006) Avail: NTIS HC $4.25 CSCL 07A

Methods by which coal mine water could be treated for removal of manganese are examined. In order to remove manganese from mine water, strong oxidizers must be employed to oxidize it to the (+4) oxidation state in which it is relatively insoluble and will precipitate as MnO2. Both ozone and hypochlorite ion were effective in this oxidation and reduced manganese concentrations to less than 2 mg/l and in some cases to less than 0.05 mg/l. Reaction orders based on initial reaction rates are reported for the manganese (II) at pH values of 2, 4, 6 and 7.9 in the time intervals studied. Solubilities of both manganese (II) hydroxide and manganese (IV) oxide were measured. Cost data were developed for both the ozone and sodium hypochlorite treatment. GRA

N75-29542# Nevada Univ., Reno. Desert Research Inst.
FINITE ELEMENT SOLUTIONS FOR THE EQUATIONS OF GROUND-WATER FLOW Hydrology and Water Resources Technical Report
Richard L. Cooley Jan. 1974 141 p refs
(Contract DI-14-31-0001-3828)
(PB-240813/6; H-W-Pub-18; W75-06083; OWRT-A-048-NEV(1)) Avail: NTIS HC $5.75 CSCL 08H

Rigorous development of the areal equations for confined and unconfined ground-water flow was accomplished by integration of the three-dimensional flow equations over the vertical. As a result it was found that all of the areal equations are best written in terms of mean head in the vertical. Discretization of the equations was accomplished through use of both finite difference-numerical integration method and a finite element technique based on the sub-domain collocation variant of the weighted residual method. GRA

N75-29543# Goodyear Aerospace Corp., Akron, Ohio.
ASSOCIATIVE ARRAY PROCESSING FOR TOPOGRAPHIC DATA REDUCTION Final Technical Report, Feb. - Nov. 1974
R. G. Radosevic, N. J. Adams, and M. D. Diehl Nov. 1974 179 p refs
(Contract DAAK02-73-C-0336)
(AD-A006198; GER-16164; ETL-CR-74-20) Avail: NTIS CSCL 08/2

Processing of an actual map overlay (4-mil intermittent streams) on the AAP STARAN S-1000 confirmed the interim report estimate of a 2 order of magnitude improvement over the presently implemented sequential approach. Processing included line thinning, line break detection and correction, and single and double line symbol generation. Initial efforts were made to develop AAP - raster processing system concepts, and to provide 1-mil and 2-mil resolution output data from 4-mil resolution input data. Techniques to generate additional symbology such as broken lines, railroads, area fill, and point symbols were also investigated. GRA

N75-29544# Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.
REDESIGNING FLOOD MANAGEMENT: PROJECT AGNES, PHASE 1
David J. Allee Sep. 1974 64 p refs
(Contract DI-14-31-0001-4032)
(PB-241064/5; OWRT-A-045-NY(2); W75-06520) Avail: NTIS HC $4.25 CSCL 13B

Contents: background on the Project Agnes concept; flood plain management; hydrologic aspects of flood management in the Chemung River Basin; a study of flood control planning in the Chemung River Basin 1963-1969; designing improved land use management tools; and findings in regional analysis for disaster planning. GRA

N75-29545# Bureau of Mines, Twin Cities, Minn. Twin Cities Mining Research Center.
EXTRACTING MINERALS FROM GEOTHERMAL BRINES: A LITERATURE STUDY Information Circular, 1974
Rolland L. Blake Dec. 1974 30 p refs
(PB-240681/7; BM-IC-8638) Avail: NTIS HC $3.75 CSCL 08I

The Bureau of Mines is concerned with extracting minerals from residual geothermal brines after their heat content and some demineralized water have been recovered. The potential of the domestic geothermal mineral resources, is examined along with the technical problems involved. Possible effects on the environment from reservoir fluid withdrawal and reinjection are outlined. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N75-29546*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE 100 kW EXPERIMENTAL WIND TURBINE GENERATOR PROJECT
Richard L. Puthoff and Paul Sirocky 1975 19 p refs Presented at the Wind Energy Workshop, Washington, D. C., 9-11 Jun. 1975; sponsored by ERDA
(NASA-TM-X-71758; E-8403) Avail: NTIS HC $3.25 CSCL 10A

The Energy Research and Development Administration and the NASA Lewis Research Center engaged jointly in a Wind Energy Program which included the design and erection of a 100 kW wind turbine generator. This test machine consists of a rotor turbine, transmission, shaft, alternator, and tower. The rotor, measuring 125 feet in diameter and consisting of two variable pitch blades, operates at 40 rpm and generates 100 kW of electrical power at a wind velocity of 18 mph. The entire assembly is placed on top of a tower 100 feet above ground level. The machine was scheduled to be ready for operation in August, 1975. Author

N75-29547*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THERMAL ENERGY STORAGE SYSTEMS Patent Application
Lott W. Brantley, inventor (to NASA) Filed 7 Aug. 1975 14 p
(NASA-Case-MFS-23167-1; US-Patent-Appl-SN-602618) Avail: NTIS HC $3.25 CSCL 10A

A thermal energy storage system is proposed for converting a fluid such as water, into a superheated vapor for driving a turbine. An energy storage device is provided for storing thermal energy from the vapor to be utilized should the pressure of the vapor fall below a predetermined value. The energy storage device includes a storage tank with stacked vertical compartments containing metallic spheres filled with metal alloy for storing the thermal energy and a fluid reservoir below the stacked compartments. Author

N75-29548*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SOLAR ENERGY POWER SYSTEM Patent Application
Billy K. Davis, inventor (to NASA) Filed 21 Mar. 1975 17 p
(NASA-Case-MFS-21628-2; US-Patent-Appl-SN-561020) Avail: NTIS HC $3.25 CSCL 10A

A solar energy vapor (Freon) powered system for generating electrical energy for outer space application is described. Features of the system include: storage of the heat s absorbed from the sun by a thermal capacitor in which a mass of Pyrone liquifies when heat is applied and then solidifies to provide a heat output; an efficient solar boiler which uses an anodized titanium surface and a combination of shaped boiler tubes and complimentary reflectors; and a unique arrangement of heat recovery devices. The system provides efficiency in conversion of solar radiation into a heated work medium and in the generation of power from that medium. NASA

N75-29549# Fom-Instituut voor Plasmafysica, Jutphaas (Netherlands).
HEATING AND CONTAINMENT OF A PLASMA IN A SMALL TOKAMAK DEVICE
H. DeKluiver and H. W. Piekaar Dec. 1974 9 p refs Sponsored in part by Neth. Organ. for Pure Sci. Res. (ZWO) and EURATOM
(Rept-74-87) Avail: NTIS HC $3.25

A turbulent Tokamak which could heat and contain a plasma with ion temperatures as high as 3 keV is proposed. It could be assembled from a device of the same kind used for confinement and heating studies of 1 keV plasmas, the cost difference deriving mainly from that of a 3 tesla coil set and its power supply. Theoretical justifications and the proposed magnetic field configuration are discussed. ESRO

N75-29550# Booz-Allen and Hamilton, Inc., Bethesda, Md.
ALTERNATIVE STRATEGIES FOR OPTIMIZING ENERGY SUPPLY, DISTRIBUTION, AND CONSUMPTION SYSTEMS ON NAVAL BASES. VOLUME 3: ASSESSMENT OF TOTAL ENERGY SYSTEM APPLICATIONS AT NAVAL FACILITIES Final Report, Feb. - Nov. 1974
D. Kennedy, D. Wulfinghoff, and R. Shaw 20 Nov. 1974 146 p refs
(Contract N62399-73-C-0029)
(AD-A003590; CEL-CR-75.003-Vol-3) Avail: NTIS CSCL 10/2

The key topics investigated and discussed are: advanced research in Total Energy Systems; opportunities for heat recovery from prime movers at naval facilities; and feasibility of using in-port steaming to provide power for naval shore facilities. GRA

N75-29551# Nuclear Regulatory Commission, Washington, D.C.
CONSTRUCTION OF PHILADELPHIA ELECTRIC COMPANY'S FULTON GENERATING STATION, UNITS 1 AND 2. DOCKETS NOS. 50-463 AND 50-464 Final Environmental Statement
Apr. 1975 238 p refs
(PB-241165/0; NUREG-75/033) Avail: NTIS HC $7.50 CSCL 18E

A final environmental statement related to the proposed construction of the generating station located in Fulton Township, Lancaster County, Pa. and prepared by the Office of Nuclear Reactor Regulation is presented. The environmental impact and adverse effects of the proposed facility are summarized and principal alternatives considered. It is concluded, based on a weighing of the environmental, economic, technical, and other benefits against environmental costs and available alternatives, that construction permits could be granted. GRA

N75-29552# Colorado Springs Dept. of Public Utilities, Colo.
ASSESSMENT OF A SINGLE FAMILY RESIDENCE SOLAR HEATING SYSTEM IN A SUBURBAN DEVELOPMENT SETTING *Semiannual Report*, 1 Jul. - 31 Dec. 1974
James D. Phillips 10 Jan. 1975 108 p refs
(Grant NSF GI-44210)
(PB-240784/9; NSF/RA/G-74-028) Avail: NTIS HC $5.25 CSCL 10A

The development is discussed of a solar-heated residence project in Colorado Springs, Colorado. The house and the heating system are described and the status of related information-gathering activities in areas affecting solar heating systems, such as legal, social acceptance, and economic considerations is reported. Outlines of the technical research being conducted, news clippings, and an analysis of the questionnaires completed by persons visiting the house in July, 1974, are included. GRA

N75-29553# Commerce Technical Advisory Board, Washington, D.C.
REVIEW OF PROJECT INDEPENDENCE BLUEPRINT: PANEL SUBCOMMITTEE REPORTS ON FEA-INTERAGENCY TASK FORCES
1975 308 p
(COM-75-10500/7) Avail: NTIS HC $9.25 CSCL 10B

Data, assumptions, and background information used to develop Project Independence Blueprint are discussed. Topic areas covered include: energy demand/conservation; coal; oil; natural gas; nuclear energy; future energy sources; oil shale; transportation; water and environment; human resources; finance; and materials, equipment, and construction. GRA

N75-29554# Standard Oil Co., Cleveland, Ohio. Research and Development Dept.
PRODUCTION AND ENGINEERING METHODS FOR CARB-TEK (TRADE NAME) BATTERIES IN FORK LIFT

TRUCKS Final Report, Jul. 1973 - Dec. 1974
Joseph E. Metcalfe Dec. 1974 69 p refs
(Contract DAAK02-73-C-0493)
(AD-A006548) Avail: NTIS CSCL 10/3

The Carb-Tek battery employs a porous carbon cathode, a lithium-aluminum alloy anode, a eutectic mixture of potassium chloride and lithium chloride as the electrolyte, and a tellurium tetrachloride additive. The porous carbon cathode is an aggregation of active carbon particles which have been pressed together with a suitable binder. The Carb-Tek battery employs a solid plate anode which is an alloy of aluminum and lithium. The use of this anode avoids corrosion and other problems associated with operating with liquid lithium anodes. This report describes the production of battery cells in the Sohio battery pilot line. A description of process improvements studies on various cell components is given. Pictures showing facilities, cell components and completed cells is presented. GRA

N75-29555# Solar, San Diego, Calif.
SOLAR 10 kW TURBOALTERNATOR SILENT POWER PROGRAM Final Report, Jan. - Oct. 1974
Jerry S. Todd Nov. 1974 175 p refs
(Contract DAAK02-71-C-0311)
(AD-A006549; ER-2497) Avail: NTIS CSCL 10/2

The report covers effort to design, fabricate and test an enclosure for the 10 kW turboalternator inaudible at 100 meters in a quiet environment. The report includes past effort, present design criteria, acoustical performance and operational capability. The enclosure did meet design intent, but was overweight. GRA

N75-29556# Naval Research Lab., Washington, D.C.
MATHEMATICAL ANALYSIS OF CURRENT DISTRIBUTION IN CORROSION CELLS WITH CIRCULAR GEOMETRY Final Report
E. McCafferty 31 Jan. 1975 40 p refs
(NRL Proj. 7835; RR0220844)
(AD-A006553; NRL-7835) Avail: NTIS CSCL 07/4

The distribution of current in a corrosion cell with circular geometry has been computed on the assumption that the electrolyte has a uniform composition, so that potential distribution is given by Laplace's equation. The current distribution is more uniform along the metal surface under bulk electrolyte than under thin layers of electrolyte. For thin layers, there is a geometry effect in which corrosion attack is intensified at the anode/cathode boundary. For a fixed anode radius, this local attack is promoted by decreasing the electrolyte thickness or linear polarization parameter or by increasing the cathode radius. GRA

N75-29557# Defence Research Establishment Ottawa (Ontario).
STUDIES ON PASTED SILVER OXIDE ELECTRODES SUITABLE FOR A PILE BATTERY
George W. Allvey and Robert M. Hayashi Oct. 1974 51 p refs
(AD-A006447; DREO-R-704) Avail: NTIS CSCL 10/3

The feasibility of producing cathodes for a torpedo propulsion Ag/Zn primary battery using chemically prepared silver oxide was studied. On a practical basis, work was directed towards a pile type replacement battery for the MK NC 46 battery which would require less silver to provide at least the present power and energy densities. A suitable method for preparing AgO plates with acceptable high rate discharge characteristics was established. Approximate design values were derived for a possible replacement battery to give some indication of physical characteristics. The test results on small single electrodes were scaled up and indicated that a pile Ag/Zn battery with total design-weight of silver of less than 3.5 g/Ah can meet the MK NC 46 output requirement. GRA

N75-29558# Army War Coll., Carlisle Barracks, Pa.
OIL AND US POLICY
Robert L. Day 15 Dec. 1974 33 p refs Revised
(AD-A006473; MIRM-74-11-Rev) Avail: NTIS CSCL 05/4

The paper analyzes the rapidly growing demand for energy by the industrialized nations of the world, and the growing importance of Middle East oil. Today, Western Europe and Japan are heavily dependent on Middle East oil, and with U.S. oil production at or near peak capacity, the United States must now also look to the Middle East for ever-increasing amounts of oil--at least through 1985. Russian influence in the international oil market, financial impact of increased imports, the changing role of the international oil companies and available alternatives are discussed. U.S. vulnerability to possible short-term supply interruptions and to longer term shortfalls are projected, and remedial measures discussed. GRA

N75-29559# Reynolds, Smith and Hills, Jacksonville, Fla.
ENERGY CONSERVATION STUDY OF VETERANS ADMINISTRATION HOSPITALS. STAGE 1: BASE LINE SURVEY Final Report
Feb. 1974 122 p refs
(Contract V-594P-454)
(PB-241095/9) Avail: NTIS HC $4.25 HC also available from NTIS $22.00/set of 4 reports as PB-241094-SET CSCL 10A

A base line survey is presented that identifies and unifies all elements of energy consumption and establishes significant energy parameters at three V.A. hospitals. GRA

N75-29560# Reynolds, Smith and Hills, Jacksonville, Fla.
ENERGY CONSERVATION STUDY OF VETERANS ADMINISTRATION HOSPITALS. STAGE 2: OPERATIONAL STUDY Final Report
Feb. 1974 58 p
(Contract V-594P-454)
(PB-241096/7) Avail: NTIS HC $5.25 HC available from NTIS $22.00/set of 4 reports as PB-241094-SET CSCL 10A

The programming specifications are presented for a computer-based energy data reporting system to measure and compare management of energy usage for all V.A. hospitals. GRA

N75-29561# Reynolds, Smith and Hills, Jacksonville, Fla.
ENERGY CONSERVATION STUDY OF VETERANS ADMINISTRATION HOSPITALS. STAGE 3: HOSPITAL ENERGY CONTROL SYSTEM Final Report
Feb. 1974 92 p refs
(Contract V-594P-454)
(PB-241097/5) Avail: NTIS HC $4.75 HC also available from NTIS $20.00/set of 4 reports as PB-241094-SET CSCL 10A

The philosophy, the design, the mathematical details and sample results of the Hospital Energy Control System, a computerized reporting system for monitoring both energy consumption and its conservation, at all V.A. hospitals are presented. A method is included of self-scoring for use by the hospital staff in objectively determining the severity of their own correctional problems. These self-evaluating check lists provide a means of determining each hospital's existing state of thermal integrity and the needed motivation for energy conservation. Author

N75-29562# Reynolds, Smith and Hills, Jacksonville, Fla.
ENERGY CONSERVATION STUDY OF VETERANS ADMINISTRATION HOSPITALS. STAGE 4: BASIC DETAIL DATA FOR STAGE 1, 2, AND 3 Final Report
Feb. 1974 594 p
(Contract V-594P-454)
(PB-241098/3) Avail: NTIS HC $9.50 HC also available from NTIS $20.00/set of 4 reports as PB-241094-SET CSCL 10A

For abstract, see N75-29561.

N75-29563# Army Foreign Science and Technology Center, Charlottesville, Va.
STATE STANDARDS OF THE USSR, LEAD-ACID AUTOMOTIVE STORAGE BATTERIES GOST 959.0-71
20 Sep. 1974 68 p Transl. into ENGLISH from Russian State Standard GOST 959.0-71, 1973
(AD-A006093; FSTC-HT-23-930-74) Avail: NTIS CSCL 10/3

A review of state standards for lead starting storage batteries used in heavy vehicles is presented. The standards show methods in which the batteries must be tested, stored, transported and packed, as well as their general specifications. The general specifications of various types of storage batteries are given, as is a breakdown of the arbitrary designation of each of them. GRA

N75-29564# Army Foreign Science and Technology Center, Charlottesville, Va.
THERMOELECTRIC PROPERTIES OF NATURAL LEAD SULFIDE AND SYNTHETIC N-LEAD SULFIDE
G. B. Abdullaev 20 Nov. 1974 8 p refs Transl. into ENGLISH from Izv. Akad. Nauk Azerb. SSR Seriya Fiz.-Tekhn. i Mat. Nauk (USSR), no. 5, 1969
(AD-A006082; FSTC-HT-23-1576-71) Avail: NTIS CSCL 20/12

The development of materials based on lead sulfide or galena for use as thermoelements is presented. Samples of synthetic lead sulfide were prepared through powder metallurgy and the thermoelectric properties were compared with those of galena. Iron was used with galena to develop thermoelements for the temperature range 650 - 300 C. Nickel-antimonide comprised the intermediate layer between the iron and lead sulfide. The volt-ampere characteristics were studied and a thermobattery constructed. Various industrial applications of a thermoelectric generator with thermoelements based on galena and iron are indicated. J.M.S.

N75-29565# Army Foreign Science and Technology Center, Charlottesville, Va.
EFFECT OF THE ELECTROLYTE TEMPERATURE DURING CHARGING OF PLATES ON THE CHARACTERISTICS OF ELECTRODES AND CELLS OF LEAD ACID AUTOMOTIVE STORAGE BATTERIES
E. F. Bordt, V. V. Novoderezhkin, and Z. S. Kudzevich 17 Sep. 1974 16 p refs Transl. into ENGLISH from Sb. Rabbot po Khimicheskim Istochnikam Toka (USSR), v. 7, 1972
(AD-A006079; FSTC-HT-23-1000-74) Avail: NTIS CSCL 10/3

A study was made of the effect that increasing the initial electrolyte temperature from 20 to 40 and increasing the process-averaged temperature from 40 to 64 has on the characteristics of electrodes and automotive batteries based on these electrodes. GRA

N75-29566# Army Foreign Science and Technology Center, Charlottesville, Va.
LONG WAVE SENSITIVITY OF SOLAR CONVERTERS N-CdS-Cu(2-X)S
A. I. Marchenko, S. Yu. Pavelets, and G. A. Fedorus 19 Nov. 1974 8 p refs Transl. into ENGLISH from Ukr. Fiz. Zh. (Ukrainian SSR), v. 15, no. 9, 1970 p 1530-1534
(AD-A005918; FSTC-HT-23-1574-71) Avail: NTIS CSCL 10/2

Polycrystalline layers of CdS and films of CdS were used to examine the long wave sensitivity of photocells. Heteorjunctions were created by submerging the CdS layers or films in an acqueous solution of CuCl heated to 100 C. It is shown that the spectral sensitivity of photoconverters is explained by the mechanism of photovoltaic effect. J.M.S.

N75-29567# Hughes Aircraft Co., El Segundo, Calif. Space and Communications Group.
NICKEL HYDROGEN ENERGY STORAGE SATELLITES Final Report, 1 Jul. 1973 - 31 Oct. 1974
E. Levy, Jr., H. H. Rogers, R. J. McGrath, and A. Wittmann Nov. 1974 231 p refs
(Contract F33615-73-C-2064; AF Proj. 3145)
(AD-A006427; SCG-40365R; AFAPL-TR-74-111) Avail: NTIS CSCL 10/3

Work was performed over a 15 month period toward development of lightweight, multiorbit energy storage systems for satellites. The program objective was to use the inherent advantages of nickel-hydrogen cells such as higher energy density, longer life, use of pressure for charge indication and charge control, and tolerance for overcharge and overdischarge. A secondary objective was to investigate the use of a common system or common module for both low and synchronous orbit satellites. This was an exploratory development program to define critical design problems and initiate solutions. The program included subcontracting 50 A-hr cells, both boiler plate and lightweight; performing parametric and cycle tests; analyzing thermal, structural, and electrochemical performance; pressure vessel material studies and material tests; and integrating the cells into spacecraft. The study and test program resulted in a recommended design of a 50 A-hr cell with an estimated flight weight of 2.75 pounds. GRA

N75-29568# Army Foreign Science and Technology Center, Charlottesville, Va.
AN AUTOMATIC CHARGE-DISCHARGE DEVICE FOR TESTING STORAGE BATTERIES
V. P. Koshmin 20 Nov. 1974 16 p Transl. into ENGLISH from Sb. Rab. po Khimicheskim Istochnikam toka (Leningrad), no. 6, 1971 p 247-254
(AD-A005978; FSTC-HT-23-173-75) Avail: NTIS CSCL 10/3

The article gives a description of and specifications for AZRU-17-0,8, an automatic charge-discharge device. It is used for charging and discharging various kinds of storage batteries with nominal voltages from 12-24 volts and charge currents up to 1.5 a. Discharge current ranges from 0.5 to 10 a. Charging takes place in two steps: first, charge current is stabilized; then, current decreases while charge voltage is stabilized. GRA

N75-29569# Army Electronics Command, Fort Monmouth, N.J.
PRELIMINARY SAFETY ANALYSIS OF LITHIUM BATTERIES
Herbert F. Hunger and John A. Christopulos Feb. 1975 43 p refs
(DA Proj. 1S7-62705-AH-94)
(AD-A006149; ECOM-4292) Avail: NTIS CSCL 10/3

This report covers the safety aspects of lithium batteries from R and D through manufacture, handling, storage, transport, and operation to disposal. Lithium batteries have advantages over conventional batteries, such as high energy content and low temperature operation capability. The high chemical activity of lithium batteries, however, is the reason for potential hazards, such as explosions, fires, and release of toxic chemicals. Suggested methods to bring these hazards under control are discussed. Further, safety precautions to be taken by operating personnel and during the fabrication process are outlined. GRA

N75-29570# Colorado Springs Dept. of Public Utilities, Colo. Dept. of Public Utilities.
ASSESSMENT OF A SINGLE FAMILY RESIDENCE SOLAR HEATING SYSTEM IN A SUBURBAN DEVELOPMENT SETTING Monthly Report
James D. Phillips 10 Nov. 1974 38 p
(Grant NSF GI-44210)
(PB-240553/8; NSF/RA/G-74-018) Avail: NTIS HC $3.75 CSCL 13A

Briefly discussed are problems and costs relating to a solar house heating system that is on automatic control. GRA

N75-29012* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE LONG TERM ENERGY PROBLEM AND AERONAUTICS
Richard A. Rudey *In its* NASA/Univ. Conf. on Aeron. 1975 p 183-210 refs (For availability see N75-29001 20-01) CSCL 10B

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N75-29571 British Library Lending Div., Boston Spa (England).
THE CONTROL OF NITROGEN OXIDE EMISSION FROM STATIONARY SOURCES
S. Hirasawa Jun. 1975 34 p refs Transl. into ENGLISH from Sangyo Kogai (Japan), v. 9, no. 9, 1973 p 24-34
(BLL-RTS-9849) Avail: British Library Lending Div., Boston Spa, Engl.: £10.00; 16 BLL photocopy coupons

The enactment of environmental regulations in Japan for the reduction of nitrogen oxide emissions, particularly those from industrial plants, is discussed. Possible methods for suppressing no formation in combustion processes and removing nox from flue gases are described. Author

N75-29572# Argonne National Lab., Ill.
AIRPORT VICINITY AIR POLLUTION STUDY: THE IMPACT OF MODIFIED AIRCRAFT TAXI PROCEDURES ON AIRPORT AIR QUALITY Final Report
R. R. Cirillo, John F. Tschanz, and Joseph E. Camaioni Dec. 1974 185 p refs
(Contract DOT-FA71WAI-223)
(AD-A009882; FAA-RD-74-212) Avail: NTIS HC $7.00 CSCL 01/5

An analysis of an aircraft ground operation control measure designed to reduce air pollutant emissions is presented. Turbine-powered air carrier aircraft taxied on one less engine with the remaining engines at higher thrust settings. Observations made at the airport during the field test are used to estimate the total reduction in engine operating time and the equivalent reduction in emissions. An inventory of airport and regional emissions sources is assembled and the Argonne Airport Vicinity Air Pollution Model is used to calculate the improvement in air quality resulting from the test program. Comparison is made with air quality data collected both before and during the modified taxi test for model validation. The test findings indicate that this type of ground operational control demonstrates a small impact on airport and regional air quality. Although the pollutant concentration reductions are substantially less than was anticipated, the operational procedures can be implemented with minor disruptions to air traffic control procedures and result in air quality improvement and fuel savings. These procedures are considered to be a viable supplement to other control strategies. Author

N75-29573# Environmental Protection Agency, Research Triangle Park, N.C. Emission Standards and Engineering Div.
BACKGROUND INFORMATION FOR STANDARDS OF PERFORMANCE: ELECTRIC SUBMERGED ARC FURNACES FOR PRODUCTION OF FERROALLOYS. VOLUME 1: PROPOSED STANDARDS
Oct. 1974 167 p refs
(EPA-450/2-74-018A) Avail: NTIS HC $6.25

Results of an investigation of the air pollution control methods available to the ferroalloy industry and the impact of their costs on the industry are presented for the purpose of explaining the background and basis of the proposed standards of performance for the industry. The proposed standards are described along with emission control devices for various furnaces. Alternative standards and enforcement aspects are discussed. J.M.S.

N75-29574# World Meteorological Organization, Geneva (Switzerland).
WMO OPERATIONS MANUAL FOR SAMPLING AND ANALYSIS TECHNIQUES FOR CHEMICAL CONSTITUENTS IN AIR AND PRECIPITATION. PART 1: THE MINIMUM PROGRAMME AT REGIONAL AIR-POLLUTION STATIONS. PART 2: GUIDELINES FOR BASELINE STATIONS AND REGIONAL STATIONS WITH EXTENDED PROGRAMMES
1974 109 p refs
(WMO-299; ISBN-92-63-10299-6) Avail: NTIS HC $5.25

Air pollution stations are classified according to their programs. Minimum program for regional air pollution stations is comprised of atmospheric turbidity measurement and constituents of precipitation sampling and analysis. Baseline stations considered as research enterprises and some regional stations have more extended programs aimed at documenting long term changes in atmospheric composition of significance to weather and climate. All aspects of relevant data acquisition and coding, sampling and methods of analysis, equipment and methodology are standardized and an operations manual proposed. ESRO

N75-29575# Environmental Protection Agency, Washington, D.C. Effluent Guidelines Div.
DEVELOPMENT DOCUMENT FOR EFFLUENT LIMITATIONS GUIDELINES AND NEW SOURCE PERFORMANCE STANDARDS FOR THE STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY
Charles R. Nichols Oct. 1974 865 p
(PB-240853/2; EPA-440/1-74-029-a) Avail: NTIS SOD HC CSCL 13B

The findings of an extensive study of the steam electric power generating point source category for the purpose of developing effluent limitations, guidelines, standards of performance for new sources, and pretreatment standards for the industry are presented. The standards of performance for new sources indicate the degree of effluent reduction which is achievable through the application of control technology, process, operating methods, or other alternatives. Findings, conclusions, and recommendations on control and treatment technology relating to chemical wastes and thermal discharges from steam electric power plants are reported. Supporting data for development of the effluent limitations, guidelines, and standards of performance are included. GRA

N75-29576# Environmental Protection Agency, Washington, D.C. Effluent Guidelines Div.
DEVELOPMENT DOCUMENT FOR EFFLUENT LIMITATIONS GUIDELINES AND NEW SOURCE PERFORMANCE STANDARDS FOR THE PRIMARY ALUMINUM SMELTING SUBCATEGORY OF THE ALUMINUM SEGMENT OF THE NONFERROUS METALS MANUFACTURING POINT SOURCE CATEGORY Final Report
George S. Thompson, Jr. Mar. 1974 142 p refs
(PB-240859/9; EPA-440/1-74-019-d) Avail: NTIS; SOD HC CSCL 13B

Effluent limitations, guidelines, and standards of performance for the aluminum industry are presented. The degree of effluent reduction attainable through the application of pollution control technology is indicated. The data recommendations provided relate to the production of primary aluminum by the electrolysis of alumina. GRA

N75-29577# Environmental Protection Agency, Washington, D.C. Effluent Guidelines Div.
DEVELOPMENT DOCUMENT FOR EFFLUENT LIMITATIONS GUIDELINES AND NEW SOURCE PERFORMANCE STANDARDS FOR THE SYNTHETIC POLYMER SEGMENT OF THE PLASTICS AND SYNTHETIC MATERIALS MANUFACTURING POINT SOURCE CATEGORY Final Report
David L. Becker Jan. 1975 302 p
(PB-240862/3; EPA-440/1-75-036-b) Avail: NTIS; SOD HC CSCL 13B

Effluent guidelines, limitations, and standards of performance for the synthetic polymers segment of the plastics and synthetics industry are presented. Major products included are: ethylene vinyl acetate copolymers, polytetrafluoroethylene, polypropylene fiber, cellulose nitrate, polyamides, polyester resins, and silicons. The application of available pollution control technology is considered along with costs. GRA

N75-29578# Environmental Protection Agency, Washington, D.C. Effluent Guidelines Div.
DEVELOPMENT DOCUMENT FOR EFFLUENT LIMITATIONS GUIDELINES AND NEW SOURCE PERFORMANCE STANDARDS FOR THE FORMULATED FERTILIZER SEGMENT OF THE FERTILIZER MANUFACTURING POINT SOURCE CATEGORY
Elwood E. Martin Jan. 1975 74 p refs
(PB-240863/1; EPA-440/1-75-042-a) Avail: NTIS; SOD HC CSCL 13B

The fertilizer industry was investigated to determine industry control practices, water effluent treatment technologies, and cost data related to these items as information from which meaningful effluent guidelines could be developed. Only ammonium sulfate manufacture as a synthetic, a coke oven by-product material, and the mixed and blend fertilizer processes are included. Processes, wastes, and control technologies discussed. GRA

N75-29579# Environmental Protection Agency, Washington, D.C. Effluent Guidelines Div.
DEVELOPMENT DOCUMENT FOR EFFLUENT LIMITATIONS GUIDELINES AND NEW SOURCE PERFORMANCE STANDARDS FOR THE PHOSPHORUS DERIVED CHEMICALS SEGMENT OF THE PHOSPHATE MANUFACTURING POINT SOURCE CATEGORY
Elwood E. Martin Jan. 1974 158 p refs
(PB-241018/1; EPA-440/1-74-006-a) Avail: NTIS; SOD HC CSCL 13B

The phosphate manufacturing industry defined as the manufacture of phosphorus, phosphorus acid, phosphorus

pentoxide, phosphorus pentasulfide, phosphorus trichloride, phosphorus oxychloride, sodium tripolyphosphate, and the calcium phosphates was investigated to develop effluent limitations, guidelines, standards of performance, and waste pretreatment standards. The degree of effluent reduction attainable through application of pollution control technology is indicated along with economic feasibility. GRA

N75-29580# Washington Univ., Seattle. Lab. for Chemometrics.
SOURCE IDENTIFICATION OF OIL SPILLS BY PATTERN RECOGNITION ANALYSIS OF NATURAL ELEMENTAL COMPOSITION
D. L. Duewer, B. R. Kowalski, and T. F. Schatzki Feb. 1975 42 p refs Prepared in cooperation with Western Regional Research Lab., Berkeley, Calif.
(Contract N00014-67-A-0103-0036; NR Proj. 051-565)
(AD-A006471; ITR-7) Avail: NTIS CSCL 13/2

Pattern recognition techniques are applied to the problem of determining the source of an oil spill. The utility of various elements for making this determination is assessed. Classification procedures using comparisons of the field sample to single known source samples and to multiple (fuzzy) artificially weathered source samples of a given type are presented and discussed. GRA

N75-29581# Army Construction Engineering Research Lab., Champaign, Ill.
HANDBOOK FOR ENVIRONMENTAL IMPACT ANALYSIS Final Report
R. K. Jain, L. V. Urban, and G. S. Stacey Sep. 1974 216 p refs
(AD-A006241; CERL-TR-E-59) Avail: NTIS CSCL 13/2

Recommended procedures are presented for use by army personnel in the preparation and processing of environmental impact assessments and statements. The procedures outline in step-by-step fashion the progressive actions necessary to satisfy the requirements of the National Environmental Policy Act of 1969 and the subsequent guidelines issued by the President's Council Environmental Quality charging all federal agencies to utilize a systematic and interdisciplinary approach to incorporate environmental considerations into their decision making process. GRA

N75-29582# Air Force Weapons Lab., Kirtland AFB, N.Mex.
USAF AIRCRAFT POLLUTION EMISSION FACTORS AND LANDING AND TAKEOFF LTO CYCLES Final Report, 1 Jun. - 1 Nov. 1974
Dennis F. Naugle and Steven R. Nelson Feb. 1975 50 p refs
(AD-A006239; AFWL-TR-74-303) Avail: NTIS CSCL 13/2

Analysis of total pollution emissions from USAF aircraft requires basic data such as aircraft engine pollution emission factors and landing and takeoff (LTO) time-in-modes. The report updates the list of measured pollution emission factors specific to each major USAF aircraft engine type. Results of original research to define USAF LTO cycle times for nine operational modes per aircraft type are presented. GRA

N75-29583# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A COMPUTER PROGRAM FOR EVALUATION OF SOLID WASTE RESOURCE RECOVERY M.S. Thesis
Allan K. Bean and Lee E. Schmidt Jan. 1975 232 p refs
(AD-A006356) Avail: NTIS CSCL 13/2

This report presents a systematic method for evaluating facility designs for processing and recovering resources from solid wastes at Air Force Bases. Values for parameters of three populations--solid waste composition, recovered resources market, and resource recovery equipment--were developed based on review of the literature. A FORTRAN Y computer program for use on the CREATE computer system was developed, tested, and used to determine the net annual cost of twelve facility designs built into the program. Options are available in the program for adding additional designs. Sensitivity of cost for changes in solid waste composition, market prices, and annual tons processed was evaluated. GRA

N75-29584# Chicago Univ., Ill.
LAND USE FORMS AND THE ENVIRONMENT. AN EXECUTIVE SUMMARY Final Report
Brian J. L. Berry Mar. 1975 24 p
(Grant EPA-R-801419)
(PB-241093/4; EPA-600/5-75-003) Avail: NTIS HC $3.25 CSCL 13B

The study investigated the influence of the spatial distribution of land rises on the pollutants generated and the resulting environmental quality. A comparative analysis of the materials assembled for the table determined trends across the urban forms and land use types, focusing particularly on the identification of those land use forms that naturally generate the least pollution. Also, parallel investigation of national trends in population distribution and land use was performed, so that some expectations could be developed as to the likely impacts on pollution of current patterns of regional growth and change. GRA

N75-29585# Environmental Quality Systems, Inc., Rockville, Md.
CHARACTERIZATION OF VESSEL WASTES IN DULUTH-SUPERIOR HARBOR Final Report
Garth D. Bumtz Dec. 1974 60 p refs
(Grant EPA-R-802772)
(PB-241081/9; EPA-670/2-74-097) Avail: NTIS HC $4.25 CSCL 13B

Five wastes were studied during late 1973: bilge water, non-oily ballast water, sewage, garbage/refuse, and dunnage. Vessels generate bilge water at about 6,650 liters/hour with an average oil content of about 225 milligrams/liter. Waste oil which is apparently discharged to bilges (about 600 grams/hour) appears more consistent than either of these two parameters. Bilge water is a substantial pollution problem: on the average about 40 liters (10 gallons) of oil may be discharged during each day a vessel spends in the harbor. Ballast water is not a significant environmental problem, but large quantities are discharged. Sewage is apparently generated onboard vessels consistent with accepted design rates (100 gallons/man/day). GRA

N75-29586# Illinois Univ., Urbana. Water Resources Center.
TRANSPORT PROCESSES OF PARTICLES IN DILUTE SUSPENSIONS IN TURBULENT WATER FLOW, PHASE 3 Research Report
Barclay G. Jones, Neil M. Howard, Charles C. Meek, and James Tomking Dec. 1974 110 p refs
(Contract DI-14-31-0001-3582)
(PB-239790/9; UILU-WRC-74-0091; W75-04933; OWRT-B-067-ILL(2)) Avail: NTIS HC $5.25 CSCL 13B

Understanding the basic mechanisms and predicting the behavior of particles suspended in turbulent fluid flow are essential to environmental conservation and to multiphase system design. Air and water pollution, sedimentation and erosion of river beds and coastal shorelines, and atmospheric fallout are some of the areas in which particle suspensions are of key importance. Detailed experimental measurements of dilute particle suspensions have been performed which examined the effects of particle size, shape and relative density on the statistical response of such particles in a turbulent fluid. Shape was found to be of minor importance for spheres, cubes and tetrahedrons. GRA

N75-29587# Chicago Univ., Ill. Center for Urban Studies.
ENVIRONMENTAL REGULATIONS AND ENERGY FOR HOME HEATING
Alan S. Cohen, John L. Gardner, and Gideon Fishelson 1974 12 p Prepared in cooperation with Argonne Natl. Lab., Ill.
(Grants NSF AG-352; NSF GI-32989A2)
(PB-240699/9; NSF/RA/E-74-027) Avail: NTIS HC $3.25 CSCL 21D

This report considers the effects of residential fuel policies on: (1) costs to tenants, landlords, coal distributors and others affected by the regulation, (2) price of fuels, (3) human health and material property, and (4) air quality. The policies compared are: (1) no restrictions, (2) a low sulfur law banning the use of fuels having more than a one percent sulfur content, (3) a coal ban, still allowing oil with no more than a one percent sulfur content, and (4) a complete ban on the use of coal and oil. Implications for national energy and environmental policies are discussed. GRA

N75-29588# Tennessee Univ., Knoxville.
DESIGN PHASE OF AN ENVIRONMENTAL TECHNOLOGY UTILIZATION PILOT PROJECT THROUGH THE AGRICULTURAL EXTENSION SERVICE IN TENNESSEE Final Report
John R. Jared Mar. 1974 89 p
(Grant NSF GT-39356)
(PB-240761/7; NSF/RA/G-74-006) Avail: NTIS HC $4.75 CSCL 05B

The capacity of the Cooperative Extension Service to deliver and apply across-the-board environmental information to local people to meet their needs was determined. One of the major project tasks was a statewide survey to determine felt perceptions among Tennessee's residents concerning many aspects of the environment. After completing survey analyses, an operational pilot project was designed. GRA

N75-29589# Exxon Research and Engineering Co., Linden, N.J.
SULFATE CONTROL TECHNOLOGY ASSESSMENT. PHASE 1: LITERATURE SEARCH AND ANALYSIS
William R. Leppard Nov. 1974 50 p refs
(Grant EPA-68-03-0497)
(PB-240995/1; EPA-640/3-75-002-A) Avail: NTIS HC $3.75 CSCL 07D

The literature pertaining to the fate of sulfur oxides in automotive exhaust systems is reviewed to investigate the thermodynamic potential and kinetics of forming the trioxide and to examine the fate of both oxides in the exhaust system. Since sulfuric acid emissions may be deleterious, the literature pertaining to removal of sulfur oxides from gaseous streams was also reviewed with emphasis on the use of metal-oxide sorbents. GRA

N75-29590# Industrial Bio-Test Labs., Inc., Northbrook, Ill.
FEASIBILITY OF 5 gpm DYNACTOR/MAGNETIC SEPARATOR SYSTEM TO TREAT SPILLED HAZARDOUS MATERIALS Final Report
Robert G. Sanders, Stanley R. Rich, and Thomas G. Pantazelos Apr. 1974 41 p refs
(Contract EPA-68-01-0123)
(PB-241080/1; EPA-670/2-75-004) Avail: NTIS HC $3.75 CSCL 13B

Design and operating details are given for a new type of continuous flow thin film, gas-liquid-particulate contact device called the Dynactor. The device is used as a continuous flow short-time contact reactor to effectively decontaminate water contaminated with spilled hazardous materials. The decontamination is effectively achieved by one or more processes involving oxidation, neutralization, precipitation, or adsorption on powdered carbon. Experimental data on successful decontamination of heavy metals by precipitation, acids and bases by neutralization, phenol, chlorine and pesticides by powdered carbon adsorption and other selected hazardous compounds are presented. GRA

N75-29591# Chase Econometric Associates, Inc., Bala Cynwyd, Pa.
THE MACROECONOMIC IMPACTS OF FEDERAL POLLUTION CONTROL PROGRAMS Final Report
Jan. 1975 87 p
(Contract EQ5AC002)
(PB-240979/5; EQ-5AC0021375) Avail: NTIS HC $4.25 CSCL 05C

The report continuation and updating of previous work in assessing the macroeconomic impact of federal environmental program is reported. The analysis uses abatement cost estimates for 1973-1982 supplied by EPA and CEQ for air and water pollution abatement. The analysis was performed using the Chase macroeconomic and input/output models. GRA

N75-29592# Versar, Inc., Springfield, Va.
ASSESSMENT OF INDUSTRIAL HAZARDOUS WASTE PRACTICES, STORAGE AND PRIMARY BATTERIES INDUSTRIES Final Report, Apr. - Sep. 1974
L. C. McCandless, R. Wetzel, J. Casana, and K. Slimak Jan. 1975 258 p refs
(Contract EPA-68-01-2276)
(PB-241204/7; EPA-530/SW-102c) Avail: NTIS HC $8.50 CSCL 13B

The battery industry was studied because heavy metals such as mercury, cadmium, zinc, and lead are used in some of its manufacturing processes. These metals can be toxic in certain concentrations and forms. The potentially hazardous wastes destined for land disposal from the battery industry consist of industrial processing wastes, reject cells, and sludges from water pollution control devices. The amount of sludges destined for land disposal is expected to experience a large short term increase as water effluent guidelines are implemented. The impact of water effluent guidelines on land disposal of wastes is the largest single factor in determining future trends for this industry. GRA

N75-29593# National Oceanic and Atmospheric Administration, Washington, D.C.
REPORT TO THE CONGRESS ON OCEAN POLLUTION, OVERFISHING, AND OFFSHORE DEVELOPMENT; JULY 1973 THROUGH JUNE 1974
Jan. 1975 84 p refs
(COM-75-10509/8; NOAA-75040305) Avail: NTIS SOD HC CSCL 13B

Accomplishments and other aspects of U.S. marine research efforts directed at long-range effects of pollution, overfishing, and other man-induced changes of ocean ecosystems are described in this annual report to Congress. Areas addressed include an overview of marine environmental research activities concerning marine pollution research on petroleum hydrocarbons, heavy metals, and synthetic hydrocarbons at the government and private sector levels; offshore development (deepwater ports, powerplants, ocean mining, and oil and gas development); regional studies on marine pollution; and various overfishing developments. GRA

N75-29594# National Environmental Research Center, Research Triangle Park, N.C. Chemistry and Physics Lab.
A SPECTROSCOPIC STUDY OF CALIFORNIA SMOG Final Report
Philip L. Hanst, William E. Wilson, Ronald K. Patterson, Bruce W. Gay, Jr., and Lucian W. Chaney Feb. 1975 69 p refs
(PB-241022/3; EPA-650/4-75-006; APTIC-75095) Avail: NTIS HC $4.25 CSCL 04A

Long-path infrared spectroscopy has yielded data on the composition and chemistry of the polluted air at Pasadena, California. Infrared radiation was transmitted along a 417 meter path folded between mirrors in a class tube 9 meters long. Spectra of polluted air were recorded with a Fourier transform spectrometer system and were plotted in ratio mode against the spectra of humidified reference air. This ratio plotting allowed the observation of weak pollutant absorption lines by removing the background spectrum of water and carbon dioxide lines. Data were taken in late November 1972 and in the summer of 1973. The chemistry of the air is discussed in terms of the observations. GRA

N75-29595# National Academy of Sciences - National Research Council, Washington, D.C. Comm. for the Working Conf. on Principles of Protocols for Evaluating Chemicals in the Environment.
PRINCIPLES FOR EVALUATING CHEMICALS IN THE ENVIRONMENT
Jan. 1975 458 p refs
(Contract EPA-68-01-0132)
(PB-240916/7; ISBN-0-309-02248-7) Avail: NTIS MF $2.25; HC available from Natl. Acad. of Sci., 2101 Constitution Ave., N. W. Washington D. C. CSCL 06F

Ways to evaluate and test environmental chemicals for their potential impact on human health and other systems are described. Areas of discussion include risk-benefit analysis, exposure levels, and statistical considerations. The human health effects investigated were acute, subchronic and chronic toxicity, chemical carcinogenesis, and effects on reproduction and behavior. Nonhuman biological effects were studied via simulated systems and field studies of populations and ecosystems. The consequences of episodic exposure as opposed to ambient exposure and effects on inanimate systems were considered. Methods for analysis and monitoring are described. GRA

N75-29596# Exxon Research and Engineering Co., Linden, N.J.
EVALUATION OF POLLUTION CONTROL IN FOSSIL FUEL

CONVERSION PROCESSES: GASIFICATION. SECTION 1: CO2 ACCEPTOR PROCESS Final Report
C. E. Jashing and E. M. Magee Dec. 1974 68 p refs
(Contract EPA-68-02-0629)
(PB-241141/1; EPA-650/2-74-009D) Avail: NTIS HC $4.25 CSCL 07A

Results are given of a review of the CO2 Acceptor Coal Gasification Process from the standpoint of its effect on the environment. The quantities of solid, liquid, and gaseous effluents are estimated, where possible, as well as the thermal efficiency of the process. For the purpose of reducing environmental impact, a number of possible process modifications or alternatives are proposed and new technology needs are pointed out. GRA

N75-29597# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning Standards.
REPORT TO CONGRESS ON CONTROL OF SULFUR OXIDES
Feb. 1975 68 p refs
(PB-241021/5; EPA-450/1-75-001; APTIC-75097) Avail: NTIS HC $4.25 CSCL 13B

The compliance status of existing coal-fired steam electric power plants is discussed along with alternative methods for compliance with applicable emission regulations. Compliance alternatives include the use of low-sulfur coal, physical coal desulfurization, flue-gas desulfurization, coal gasification, fluidized-bed boilers, supplementary control systems, and energy recovery from solid waste. A review is presented showing the current status of existing coal-fired plants in terms of the sulfur content of coal purchased during the first half of 1974, the involvement of power companies in litigation challenging the applicable regulations, and the programs for achieving compliance with sulfur regulations in State Implementation Plans. GRA

N75-29598# Bureau of Mines, Bartlesville, Okla. Energy Research Center.
DEVELOPMENT AND UTILITY OF REACTIVITY SCALES FROM SMOG CHAMBER DATA
B. Dimitriades, G. P. Sturm, Jr., T. C. Wesson, and F. D. Sutterfield Mar. 1975 24 p refs Prepared in cooperation with EPA, Ann Arbor, Mich.
(PB-241248/4; BM-RI-8023) Avail: NTIS HC $3.25 CSCL 07E

The reactivities of 19 hydrocarbons, known to be prominently present in automotive exhaust and ambient air, were measured in a smog chamber and were found to agree well with results from two other smog chambers. Reactivity scales were developed for hydrocarbons and aldehydes. Application of the reactivity scales to automotive exhaust samples gave fair agreement between predicted and observed rate-of-NO2 formation values but poor correlation between predicted and observed ozone-yield values. GRA

N75-29599# Air Products and Chemicals, Inc., Marcus Hook, Pa. Houdry Div.
ENGINEERING AND COST STUDY OF AIR POLLUTION CONTROL FOR THE PETROCHEMICAL INDUSTRY. VOLUME 2: ACRYLONITRILE MANUFACTURE Final Report
W. A. Schwartz, F. B. Higgins, Jr., J. A. Lee, R. Newirth, and J. W. Pervier Feb. 1975 103 p
(Contract EPA-68-02-0255)
(PB-240986/0; EPA-450/3-73-006b) Avail: NTIS CSCL 07A

The manufacture of acrylonitrile is discussed. A process and industry description is given along with an engineering description of available emission control systems, the cost of these systems, and the financial impact of emission control on the industry. Recommendations are included for air episode procedures and plant inspection procedures. GRA

N75-29600# Stone (Ralph) and Co., Inc., Los Angeles, Calif.
THE EFFECTS OF AIR AND WATER POLLUTION CONTROLS ON SOLID WASTE GENERATION, 1971 - 1985. EXECUTIVE SUMMARY Final Report
Dec. 1974 84 p refs
(Contract EPA-68-03-0244)
(PB-240739/2; EPA-620/2-74-095a) Avail: NTIS HC $4.75 CSCL 13B

The effects of air and water pollution, controls on solid waste generation were evaluated. The solid wastes from pollution control were identified for individual industrial sectors by their original air or water pollutant constituents, and the treatment process applied. Total solid wastes from pollution control activities were estimated for 1971 and projected for 1985. Particulates and sulfur oxides were identified as the major air pollutants capable of generating solid wastes when treated; suspended solids and biological oxygen demand were identified as the principle means of estimating the impact of water pollution control on solid wastes. GRA

N75-29009* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ASSESSING AND CONTROLLING THE EFFECT OF AIRCRAFT ON THE ENVIRONMENT: POLLUTION
I. G. Poppoff and J. S. Grobman *In its* NASA/Univ. Conf. on Aeron. 1975 p 131-142 (For availability see N75-29001 20-01)
CSCL 13B

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N75-29601 British Library Lending Div., Boston Spa (England).
THE COMPONENTS OF THE ENERGY BALANCE OF THE ATMOSPHERE AND UNDERLYING SURFACE IN THE NORTHERN POLAR REGIONS
E. P. Borisenkov, V. P. Hrol, and M. S. Cernuhin [1974] 15 p refs Transl. into ENGLISH from Proc. of All-Union Symp. on GARP (Moscow), 1973 p 188-195
(BLL-M-23619-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 2 BLL photocopy coupons

The energetics of the atmosphere and ocean surface in the Arctic were investigated. The intensity and direction of latent and sensible turbulent heat fluxes between the ocean and the atmosphere were determined. Loss of energy from the atmosphere to outer space and energy storage in the ocean were discussed. Data on annual variations in useful potential energy for various latitudes were used to compare the energy fluctuations which occur at different latitudes, to evaluate the characteristics of energy exchange between different latitudes, and to estimate the total heat flux into an atmospheric column of unit cross-section. Results support the contention that the Polar regions play an important role in the formation of global atmospheric and oceanic processes. D.M.L.

N75-29602*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ATMOSPHERIC TRANSMISSION COMPUTER PROGRAM CP
D. E. Pitts, T. L. Barnett, C. L. Korb, Walter Hanby (Lockheed Electronics Co., Inc., Houston, Texas), and Alyce E. Dillinger (Lockheed Electronics Co., Inc., Houston, Texas) Dec. 1974 187 p refs
(NASA-TM-X-58137; JSC-09063) Avail: NTIS HC $17.00 CSCL 04A

A computer program is described which allows for calculation of the effects of carbon dioxide, water vapor, methane, ozone, carbon monoxide, and nitrous oxide on earth resources remote sensing techniques. A flow chart of the program and operating instructions are provided. Comparisons are made between the atmospheric transmission obtained from laboratory and spacecraft spectrometer data and that obtained from a computer prediction using a model atmosphere and radiosonde data. Limitations of the model atmosphere are discussed. The computer program listings, input card formats, and sample runs for both radiosonde data and laboratory data are included. Author

N75-29603*# Pennsylvania State Univ., University Park. Ionospheric Research Lab.
A FEASIBILITY STUDY OF A MICROWAVE WATER VAPOR

MEASUREMENT FROM A SPACE PROBE ALONG AN OCCULTATION PATH
Richard L. Longbothum 15 Apr. 1975 75 p refs
(Grants NGL-39-009-003; NSF GA-33446X1)
(NASA-CR-143266; PSU-IRL-SCI-434) Avail: NTIS HC $4.25 CSCL 04A

Stratospheric and mesospheric water vapor measurements were taken using the microwave lines at 22 GHz (22.235 GHz) and 183 GHz (183.31 GHz). The resonant cross sections for both the 22 GHz and the 183 GHz lines were used to model the optical depth of atmospheric water vapor. The range of optical depths seen by a microwave radiometer through the earth's limb was determined from radiative transfer theory. Radiometer sensitivity, derived from signal theory, was compared with calculated optical depths to determine the maximum height to which water vapor can be measured using the following methods: passive emission, passive absorption, and active absorption. It was concluded that measurements using the 22 GHz line are limited to about 50 km whereas the 183 GHz line enables measurements up to and above 100 km for water vapor mixing ratios as low as 0.1 ppm under optimum conditions. Author

N75-29604*# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
ELECTRON ANGULAR DISTRIBUTIONS ABOVE THE DAYSIDE AURORAL OVAL
J. D. Craven and L. A. Frank Jun. 1975 33 p refs
(Contracts NAS5-11265; N00014-68-A-0196-0009; Grant NGL-16-001-002)
(NASA-CR-143267; U-of-Iowa-75-23) Avail: NTIS HC $3.75 CSCL 04A

An electrostatic analyzer was employed on the Ariel 4 satellite to determine pitch angle distributions of electron intensities over the dayside auroral oval. Two major precipitation zones were encountered: an equatorward zone of broad spectra with intensities of approximately 1000 electrons/(sq cm-sec-sr-eV) and a poleward zone, the polar cusp, with intensities typical of those of the magnetosheath. Angular distributions within the equatorward zone are generally isotropic outside of the atmospheric backscatter cone. The precipitation mechanism appears to be pitch angle scattering near the distant magnetic equator. In contrast, pitch angle distributions within the polar cusp are often found to be strongly field aligned with intensities within the atmospheric loss cone greater by factors of approximately 10 than the mirroring intensities. These distributions are qualitatively similar to those for the inverted V precipitation events at later local times, and probably share a common acceleration mechanism with the inverted V phenomenon. Author

N75-29605*# Texas A&M Univ., College Station. Dept. of Physics.
MULTIPLE SCATTERED RADIATION EMERGING FROM CONTINENTAL HAZE LAYERS. 1: RADIANCE, POLARIZATION, AND NEUTRAL POINTS
George W. Kattawar, Gilbert N. Plass, and Stephen J. Hitzfelder 11 Aug. 1975 54 p refs
(Grant NGR-44-001-117)
(NASA-CR-143269; Rept-18) Avail: NTIS HC $4.25 CSCL 04A

The complete radiation field is calculated for scattering layers of various optical thicknesses. Results obtained for Rayleigh and haze scattering are compared. Calculated rediances show differences as large as 23% compared to the approximate scalar theory of radiative transfer, while the same differences are approximately 0.1% for a continental haze phase function. The polarization of reflected and transmitted radiation is given for various optical thicknesses, solar zenith angles, and surface albedos. Two types of neutral points occur for aerosol phase functions. Rayleigh-like neutral points arise from zero polarization that occurs at scattering angles of 0 deg and 180 deg. For Rayleigh phase functions, the position of these points varies with the optical thickness of the scattering layer. Non-Rayleigh neutral points are associated with the zeros of polarization which occur between the end points of the single scattering curve, and are found over a wide range of azimuthal angles. Author

N75-29606# Joint Publications Research Service, Arlington, Va.
HOW TO BUILD GULLIVER'S WATCH (BIOSPHERE MODEL)
I. Terskov and I. Gitelzon Washington NASA Aug. 1974 6 p Transl. into ENGLISH from Pravda (USSR), 1974 p 3
(NASA Order W-13183-192)
(NASA-TT-F-16455) Avail: NTIS HC $3.25 CSCL 04A

A biospheric model is discussed, using Vernadskiy's formulas. Population models, groups of organisms of a single type such as bacteria, are reviewed; these sytems can be built on flow principles. Based on model ecological systems, it was possible to construct biological-technical systems of controlled cultivation of bacteria, yeasts, algae, and agricultural plants. J.A.M.

N75-29607# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics.
A MECHANISM FOR DRIVING THE GROSS BIRKELAND CURRENT CONFIGURATION IN THE AURORAL OVAL
Gordon Rostoker and Rolf Bostroem Dec. 1974 39 p refs
Sponsored in part by Swed. Board for Space Activities and NRC of Can.
(TRITA-EPP-74-25) Avail: NTIS HC $3.75

Field-aligned sheet currents flowing into and out of the auroral oval are integrally associated with convective motion of plasma in the magnetotail. These currents can be driven by energy supplied by the braking of this convective motion of the plasma sheet particles as they drift towards the flanks of the magnetosphere. In the ionosphere the sheet currents close as Pedersen currents resulting in power being dissipated, while far from the earth the closure currents, which provide the braking force for the plasma, flow in the plasma sheet approximately normal to the neutral sheet out to radial distances of about 80 earth radii. During periods of moderate magnetospheric activity, the Birkeland currents result in a rate of dissipation of convective energy of the order of 10 GW. Author (ESRO)

N75-29608# Science Applications, Inc., Ann Arbor, Mich.
INVESTIGATION OF DF LASER PROPAGATION Final Report
Robert E. Meredith, Thomas W. Tuer, and Douglas R. Woods Dec. 1974 134 p refs
(Contract DAEA18-73-A-0127)
(AD-A005631; SAI-74-001-AA; ECOM-74-4) Avail: NTIS CSCL 04/1

Molecular absorption coefficients are calculated in the region of 27 important DF laser wavelengths for typical sea level conditions. The important absorption mechanisms for this region are discussed and improved modeling procedures are suggested. A series of graphs and tables clearly show the importance of individual molecular absorption lines and continua for each important DF line. Calculations and recommendations are given for White cell measurements of absorption coefficients for the H2O and N2 continuum, and HDO, N2O, CH4 and H2O line absorption at DF wavelengths. GRA

N75-29609# Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
COMPARISON OF ORTHOGONAL TRANSFORMS FOR TELESEISMIC DATA Interim Report
C. H. Chen 31 Oct. 1974 203 p refs
(Grant AF-AFOSR-2119-71)
(AD-A006232; EE-74-5; AFOSR-75-0272TR) Avail: NTIS CSCL 09/2

The availability of fast algorithms for computing the orthogonal transforms such as the fast Fourier transform (FFT), Walsh-Hadamard transform (WHT), discrete Chebyshev transform (DCT), and related transforms has made such transforms increasingly popular in data processing. This paper is concerned with the comparative evaluation of these transforms as applied to the ACDA teleseismic data. Computer results and program listings are provided. The paper is concluded with the recommendation that better orthogonal transforms are needed for both signal processing and seismic discrimination. GRA

N75-29610# Observatorio del Ebro, Tortosa (Spain). Ionospheric Section.
SOME RESULTS OF ELECTRON CONTENT MEASUREMENTS AT TORTOSA FROM THE INTELSAT 2-F3 TRANSMISSIONS Final Report, 1 Oct. 1971 - 30 Sep. 1974

Luis Felipe Alberca and Edwardo Galdon 29 Nov. 1974 39 p refs
(Grant AF-AFOSR-2168-72; AF Proj. 4643)
(AD-A006202; AFCRL-TR-75-0016) Avail: NTIS CSCL 04/1

From the signals of the Intelsat II-F3 satellite recorded at Tortosa, the total electron content and the slab-thickness of the ionosphere were obtained for the first six months of 1974, using a rotatory antenna. The ionosonde data of Tortosa (40 degrees 49 minutes N, 0 degrees 30 minutes E) and Arenosillo (37 degrees 14 minutes N, 6 degrees 43 minutes W) were used. The daily and seasonal variation were considered and results compared with the previous results obtained at Tortosa from the Explorer 22. Using the TEC data of the sunrise period, the electron integrated production rate for an overhead sun (Q sub 0) was calculated. The variations obtained for (Q sub 0) are interpreted as variations on the (O)/(N2) concentration ratio. The results are discussed and compared with those of other authors. GRA

N75-29611# Utah State Univ., Logan. Space Science Lab.
MOMENT METHOD SOLUTIONS FOR THE IMPEDANCE OF ASYMMETRICALLY DRIVEN RF PROBES IN THE COLLISIONAL IONOSPHERIC MAGNETOPLASMA
Hyun-Shik Hwang Aug. 1974 176 p refs
(Contract F19628-72-C-0255; AF Proj. 7663)
(AD-A006200; SR-4; AFCRL-TR-74-0394) Avail: NTIS CSCL 04/1

In order to ascertain the electron density in the earth's ionosphere by direct measurement a radio frequency (RF) impedance probe technique has proved useful. This technique involves monitoring the changes in impedance of an antenna mounted on a rocket or satellite vehicle traversing the ionospheric regions of interest. The changes of antenna impedance can be related to the electron density of the surrounding plasma through use of suitable theoretical development of the antenna-plasma interaction. It is the purpose of this treatise to develop a more general expression for the impedance of an antenna in the ionosphere to be useful as an RF probe for measurement of electron density. The investigation of ionospheric plasma characteristics by means of such RF probes has received a great deal of attention since the advent of the rocket allowed direct measurements within the ionosphere. GRA

N75-29612# TRW Systems Group, Redondo Beach, Calif.
IONOSPHERIC PLASMA EFFECTS Final Scientific Report, 1 Nov. 1972 - 31 Jan. 1975
D. Arnush, R. W. Fredericks, B. D. Fried, C. F. Kennel, and R. S. Margulies 31 Jan. 1975 10 p refs
(Contract F44620-73-C-0007; AF Proj. 9751)
(AD-A006242; TRW-22764-6004-RU-00; AFOSR-75-0162TR) Avail: NTIS CSCL 20/9

During the first half of this contract, the following effects, related to ionospheric modification experiments were investigated: (1) convective parametric amplification (improvement and exercise of a computer code yielding a theoretical parametric study of Arecibo spectral observations in qualitative agreement with measurements in restricted parameter domains); (2) refraction by the pump of parametrically generated waves in both the laboratory and the ionosphere; (3) double resonance excitation in a homogeneous plasma by infinite wavelength pumps in general and for laboratory and ionospheric applications in particular; and (4) parametric instabilities driven by linearly converted pump modes. GRA

N75-29613# Teledyne Geotechnical, Garland, Tex.
PROJECT T/3703 Final Report, Aug. 1972 - Jan. 1974
John R. Sherwin and George C. Kraus 24 Sep. 1974 67 p refs
(Contract F08606-73-C-0008)
(AD-A006437; TR-73-19) Avail: NTIS CSCL 17/10

Ten portable seismograph systems were deployed to record data from the Project RIO BLANCO detonation. A preliminary visual analysis of the data recorded at the field sites was performed. Three Task Change Proposals were accepted by the Project Office and a considerable portion of the total effort of this project was devoted to these tasks. A program to test and evaluate the Borehole Seismometer System, Model 36000, was conducted. In the second major task, documentation for the production design of the Model 36000 was completed, along with all necessary accessories, such as the Test Set/Controller, Model 37960. Also, a second experimental Model 36000 was delivered to the Government for independent evaluation. In the final task, a study of the requirements and capabilities of strain/inertial seismograph complexes was completed. GRA

N75-29614# Bureau of Mines, Bartlesville, Okla. Energy Research Center.
RIO BLANCO MASSIVE HYDRAULIC FRACTURING DEMONSTRATION Technical Progress Report
Charles H. Atkinson Feb. 1975 15 p refs
(PB-240849/0; BM-TPR-88) Avail: NTIS HC $3.25 CSCL 08I

The Rio Blanco massive hydraulic fracturing demonstration was undertaken to evaluate the simulation effects of very long fractures, suitably propped open in thick sections containing multiple intervals of low-permeability gas-bearing sands. The zone of interest for this demonstration includes Fort Union and Mesaverde sands from about 5,800 to 8,200 feet deep in Rio Blanco County, Colo., about 1 mile from the site of the May 1973 triple nuclear detonation aimed at stimulating production from the same reservoirs. The test well has now been completed at a total depth of 8,170 feet, and data obtained from logs, cores,production and drill-stem tests indicate reservoir conditions to be less favorable for gas production than anticipated. GRA

N75-29615# Ohio State Univ., Columbus. Dept. of Geodetic Science.
SOME SIMPLE METHODS FOR THE UNIQUE ASSIGNMENT OF A DENSITY DISTRIBUTION TO A HARMONIC FUNCTION
C. C. Tscherning Aug. 1974 21 p refs
(Contract F19628-72-C-0120; AF Proj. 8607)
(AD-A006026; DGS-213; AFCRL-TR-74-0506; SR-19) Avail: NTIS CSCL 08/5

One to one relationships are established between functions harmonic outside a sphere and density functions (1) with support equal to the sphere and (2) having the property that the density functions rho, multiplied by a positive function of the distance from the center of the sphere, are harmonic. The derived relations may be used to assign a density distribution to the harmonic part of the potential of the earth, and a covariance function of a density anomaly distribution to the covariance function of the anomalous potential of the earth. GRA

N75-29616# National Environmental Satellite Service, Washington, D.C.
AN INTERCOMPARISON OF RADIOSONDE AND SATELLITE-DERIVED CROSS SECTIONS DURING THE AMTEX
W. C. Shen, W. L. Smith, and H. M. Woolf Feb. 1975 24 p refs
(COM-75-10439/8; NOAA-TR-NESS-72; NOAA-75032014) Avail: NTIS; SOD HC $0.65 as C55/13:NESS-72 CSCL 04B

A comparison is made between zonal cross-sections of meteorological parameters obtained from Nimbus 5 radiance measurements and those observed by radiosondes. The results show: (1) reasonable agreement between the total water vapor content derived from infrared temperature profile radiometer and spectrometer radiance data and that observed by radiosondes; (2) good agreement between the vertical cross-section of temperature derived from radiance data and from radiosonde temperature observations; (3) good agreement between the geostrophic wind distributions derived from the Nimbus 5 and radiosonde temperature data. GRA

N75-29617# Meteorology Research, Inc., Altadena, Calif.
DETERMINATION OF THE FEASIBILITY OF THE LONG-RANGE TRANSPORT OF OZONE OR OZONE PRECURSORS Final Report
D. L. Blumenthal, W. H. White, R. L. Peace, and T. B. Smith Nov. 1974 128 p refs Prepared in cooperation with Calif. State Air Resources Board, Sacramento
(Contract EPA-68-02-1462)
(PB-241159/3; EPA-450/3-74-061) Avail: NTIS HC $5.75 CSCL 04A

The July 25, 1973 smog episode in the Los Angeles Air Basin was analyzed. Results indicate that ozone was transported

from the western, heavily urbanized, portion of the basin at rates exceeding 100 metric tons per hour. High ozone concentrations confined to the surface mixing layer in the relatively remote mountain and desert areas east and northeast of Los Angeles were documented and traced back to their probable source in the Los Angeles Air Basin. Standard diffusion estimates based on one episode indicated that, over flat terrain in the absence of scavenging mechanisms, an ozone source the size of the Los Angeles metropolitan area could cause ozone concentrations to exceed the Federal standard. GRA

N75-29618# Ohio State Univ., Columbus. Dept. of Geodetic Science.

A FORTRAN 4 PROGRAM FOR THE DETERMINATION OF THE ANOMALOUS POTENTIAL USING STEPWISE LEAST SQUARES COLLOCATION

C. C. Tscherning Jul. 1974 130 p refs

(Contract F19628-72-C-0120; AF Proj. 8607)

(AD-A006362; DGS-212; AFCRL-TR-74-0391; SR-17) Avail: NTIS CSCL 08/5

The theory of sequential least squares collocation, as applied to the determination of an approximation (T ave) to the anomalous potential of the Earth T, and to the prediction and filtering of quantities related in a linear manner to T, is developed. The practical implementation of the theory in the form of a FORTRAN 4 program is presented and detailed instructions for the use of this program are given. The program requires the specifications of (1) a covariance function of the gravity anomalies and (2) a set of observed quantities with known standard deviations. GRA

N75-29619# Ohio State Univ., Columbus. Dept. of Geodetic Science.

MEAN GRAVITY ANOMALY PREDICTION FROM TERRESTRIAL GRAVITY DATA AND SATELLITE ALTIMETER DATA

Glenn N. Smith Aug. 1974 152 p refs

(Contract F19628-72-C-0120; AF Proj. 8607)

(AD-A006363; DGS-214; SR-18; AFCRL-TR-74-0451) Avail: NTIS CSCL 08/5

This paper examines the application of the statistical prediction concept to the prediction of useful mean gravity anomalies from actual existing gravity data. The primary method of estimation is the least squares prediction procedure of Moritz. Mathematical derivation of the prediction equations and explanation of the notation system are given and prediction equations are applied to the prediction of mean gravity anomalies of 1 degrees and 5 degrees near equal-area blocks. GRA

N75-29620# Stanford Univ., Calif. Electronics Labs.

A STUDY OF ENERGETIC PARTICLE PRECIPITATION EFFECTS ASSOCIATED WITH DISCRETE VLF SIGNALS, AND OF THE MECHANISM OF VLF EMISSION GENERATION Final Report

R. A. Helliwell Feb. 1975 12 p refs

(Contract F44620-72-C-0058; AF Proj. 9751)

(AD-A006464; AFOSR-75-0311TR) Avail: NTIS CSCL 04/1

Substantial progress was made on the basic theory of wave-particle interactions. The outstanding accomplishment was the inclusion of the full distribution function of particles in the wave-particle feedback interaction model developed by this group. Other studies include (1) interpretation of the spectra of artificially-stimulated emissions; (2) prediction of electron precipitation induced by coherent waves; (3) extension of the VLF wave-particle interaction model to the generation of VLF waves. GRA

N75-29621# Southern Methodist Univ., Dallas, Tex. Geophysical Lab.

IDENTIFICATION OF EARTHQUAKES AND UNDERGROUND EXPLOSIONS Final Technical Report

Eugene Herrin Feb. 1975 166 p refs

(Grant AF-AFOSR-2133-71; ARPA Order 1827)

(AD-A006467; AFOSR-75-0314TR) Avail: NTIS CSCL 17/10

Research during the reporting period was accomplished in four categories: (a) analysis of Rayleigh wave dispersion for polar pathes, (b) development of improved array processing techniques, (c) determination of bias in network computations of body wave magnitudes, and (d) investigation of the effect on the Rayleigh spectrum of lateral heterogeneity in earthquake source regions. Because of the uniformity of group velocity dispersion within the polar wave guide and the broad-band nature of the Rayleigh waves, matched or chirp filter techniques were found to be particularly effective on data recorded at the McKinney, Texas site. GRA

N75-29622# Texas Instruments, Inc., Dallas. Equipment Group.

SOURCE STUDIES IN THE NEAR AND FAR FIELD, PART A Semiannual Technical Report, 1 May - 31 Oct. 1974

Lawrence S. Turnbull, James C. Battis, and David Sun 30 Nov. 1974 51 p refs

(Contract F44620-73-C-0055; ARPA Order 1827)

(AD-A005786; TI-ALEX(02)-TR-74-03-Pt-A; AFOSR-75-0298TR-Pt-A; SATR-3) Avail: NTIS CSCL 17/10

A program has been undertaken to examine the seismic source in the near- and far-fields. Near field accelerogram spectra have been analyzed for corner frequency, seismic moment, and stress drop. For the Bear Valley earthquake of June 22, 1973, a stress drop of 300 bars was obtained using Brune's source theory. The data sample, though, was insufficient to determine any empirical relationship between corner frequency and local magnitude and its association with stress drop. In our examination of far-field source spectral characteristics, de-multipathing procedures have been implemented on the PDP-15 interactive graphics system. Three-dimensional computer plots of double couple source spectra have been produced, and are being used in an exhaustive analysis of far-field spectral characteristics as a function of source configuration. For part B see, N75-26597. GRA

N75-29623# Royal Norwegian Council for Scientific and Industrial Research, Kjeller.

NORSAR PHASE 3 Quarterly Progress Report, 1 Oct. - 31 Dec. 1974

K. A. Berteussen 31 Jan. 1975 23 p refs

(Contract F08606-74-C-0049; ARPA Order 2551)

(AD-A005775; QPR-4) Avail: NTIS CSCL 17/10

The report covers operation and research activities at the Norwegian Seismic Array (NORSAR) in the period 1 October - 31 December 1974. A small increase in the number of instruments with characteristics outside tolerance limits has been observed, also some of the computer units have had several short stops due to faulty components. Except for that the performance of the field instrumentation and the computer installations has been satisfactory. A floating threshold procedure has been implemented in the Detection Processor. In the Event Processor some additional statistical tests have been included as a result of a study of signal-noise classification problems. A study of precursors to PP has been finished. GRA

N75-29624# Lincoln Lab., Mass. Inst. of Tech., Lexington.

SEISMIC DISCRIMINATION Semiannual Technical Summary Report, 1 Jul. - 31 Dec. 1974

Michael A. Chinnery 31 Dec. 1974 64 p refs

(Contract F19628-73-C-0002; ARPA Order 512)

(AD-A006194; ESD-TR-74-344) Avail: NTIS CSCL 17/10

This report describes 22 separate investigations in the field of seismic discrimination. These are grouped as follows: Discrimination and evasion research (5 contributions), method for the determination of focal depth (4 contributions), global seismic network studies (4 contributions), studies of earth heterogeneity (4 contributions), source mechanism studies (3 contributions), and investigations of global seismic activity (2 contributions). GRA

N75-29625# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.

ATMOSPHERIC RESPONSE FUNCTION FOR THE CALCULATION OF RIOMETER ABSORPTION

Michael A. Stroscio and Bach Sellers 27 Sep. 1974 69 p refs

(AF Proj. 8600)

(AD-A006112; AFCRL-ERP-487; AFCRL-TR-74-0472) Avail: NTIS CSCL 04/1

In this report, an atmospheric model for the calculation of riometer absorption during Polar cap absorption events is given; specifically, an atmospheric response function is calculated and tabulated at necessary altitudes for (1) each month of the year, (2) day and night, and (3) 60 degrees N and 90 degrees N latitude. In addition, a polynomial fit to the atmospheric response function is given in terms of polynomial coefficients. Also tabulated for the conditions above are the collision frequency, atmospheric depth, and scale height. GRA

N75-29626# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
ATMOSPHERIC MEASUREMENTS AT MILLIMETER WAVELENGTHS Final Report, 1 Feb. 1973 - 30 Sep. 1974
Alan H. Barrett, Kai S. Lam, and David H. Staelin Dec. 1974 26 p refs
(Contract F19628-73-C-0196; AF Proj. 8682)
(AD-A006128; AFCRL-TR-74-0633) Avail: NTIS CSCL 04/1

The study addresses the problem of measuring meteorological parameters by virtue of the natural thermal emission of the atmosphere at millimeter wavelengths. Three topics are discussed. First, the oxygen absorption coefficients are computed using a foreign gas approach based on the Liouville space formulation. Numerical results were obtained for pure oxygen with rotation quantum number N = 1 through N = 11 for T = 300K. Second, the joint use of the 60 GHz and 118 GHz oxygen resonances for determining cloud water content and altitude distribution is discussed, and finally the 118 GHz receiver for measuring the 118 GHz atmospheric spectrum is described. GRA

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N75-29627 British Library Lending Div., Boston Spa (England).
DETERMINATION OF CERTAIN PARAMETERS OF CLOUDS WITH THE AID OF A LASER LOCATOR
E. G. Svidkovskij and O. K. Kostko [1974] 6 p refs Transl. into ENGLISH from Dokl. Akad. Nauk (Moscow), 1970 p 1316-1317 In ENGLISH and in RUSSIAN
(BLL-M-23632-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 1 BLL photocopy coupon

The propagation of laser radiation in a cloudy medium is used to study the fine structure of clouds. The method is extended to include the effect of multiple scattering as well as backscattering. Examples are given. J.M.S.

N75-29628 Freie Univ., Berlin (West Germany).
METOROLOGICAL DATA. VOLUME 141, NO. 9: RESULTS OF SYNOPTIC SERVICES IN 1974. DAILY AND MONTHLY WEATHER MAPS (SURFACE, 850 MILLIBARS, 500 MILLIBARS), TABLES AND BRIEF SCIENTIFIC ARTICLES, SEPTEMBER [METEOROLOGISCHE ABHANDLUNGEN. BAND 141, HEFT 9: ERGEBNISSE DES SYNOPTISCHEN DIENSTES IM JAHRE 1974 TAEGLICHE UND MONATLICHE WETTERKARTEN (BODEN, 850 MB, 500 MB), TABELLEN UND KLEINERE WISSENSCHAFTLICHE AUFSAETZE, SEPTEMBER]
1974 206 p refs In GERMAN
Avail: Issuing Activity

Daily and monthly Northern Hemisphere ground level, 850 mb, and 500 mb height and temperature analyses of constant pressure levels for September 1974 are presented. Included scientific studies cover aspects of synoptic climatology over the Berlin sector, data on atmospheric radioactivity and dust content, and meteorological statistics for 200 summers. Transl. by G.G.

N75-29629 Freie Univ., Berlin (West Germany).
METEOROLOGICAL DATA. VOLUME 138, NO. 2: DAILY ALTITUDE CHARTS OF THE 30 MILLIBAR LEVEL AND MEAN MONTHLY CHARTS FOR 1973. PARTS 3 AND 4, 3RD AND 4TH. QUARTERS STRATOSPHERE WORKING GROUP [METEOROLOGISCHE ABHANDLUNGEN. BAND 138, HEFT 2: TAEGLICHE HOEHENKARTEN DER 30-mb-FLAECHE SOWIE MONATLICHE MITTELKARTEN FUER DAS JAHR 1973. TEIL III UND IV, 3. UND 4. VIERTELJAHR ARBEITSGRUPPE STRATOSPHAERE]
1973 253 p In GERMAN
Avail: Issuing Activity

The present volume continues the series of stratospheric weather maps published since 1957 in the Meteorologische Abhandlungen of the Meteorological Institute of the Free University. It contains daily height and temperature analyses of constant pressure levels for six months for the whole of the Northern Hemisphere, based on rawinsonde and in the upper stratosphere also on rocketsonde data and performed with the aid of a hydrostatic build-up method. The corresponding monthly mean maps, their variations and deviations are included as well as the mean gridpoint data, calculated from daily values. Moreover, the stratospheric circulation of polar, middle, and tropical latitudes is described for the period under consideration. Author

N75-29630 Freie Univ., Berlin (West Germany).
METEOROLOGICAL DATA. VOLUME 145, NO. 2: THE EUROPEAN CLIMATOLOGY FOR 1974. METEOROLOGICAL SATELLITE DATA FROM THE BERLIN ZONE OF RECEPTION PART 2, 2ND QUARTER [METEOROLOGISCHE ABHANDLUNGEN. BAND 145, HEFT 2: DAS EUROPAEISCHE WETTERBILD 1974 WETTERSATELLITEN-DATEN AUS DEM BERLINER EMPFANGSBEREICH, TEIL II, 2. VIERTELJAHR]
1974 208 p refs In GERMAN
Avail: Issuing Activity

The present volume continues the daily European weather maps for the 2nd quarter in 1974. Collected are APT photographs from ESSA 8 and film strips from the NOAA 2 and NOAA 3 scanning radiometers. Transl. by G.G.

N75-29631 British Library Lending Div., Boston Spa (England).
ON THE METHODOLOGY OF MEASURING VISUAL RANGE FOR AVIATION PURPOSES
V. I. Gorysin [1974] 27 p refs Transl. into ENGLISH from Glav. Geofiz. Obs., T. Vyp. (Leningrad), no. 312, 1973 p 50-64 In ENGLISH; partly in RUSSIAN
(BLL-M-23694-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 3 BLL photocopy coupons

Results of synchronic measurements of visibility in fog and mist are used to support the hypothesis that the atmospheric horizontal transparency is spatially very irregular. It is shown that instrument measurements of the horizontal visibility of a nonhomegeneous atmosphere differ depending on the length of the instrument measuring base. It is concluded that measurements should be conducted at 3 points along the landing strip, so that the processes of variation is recorded. A method is presented for measuring visibility in a nonhomegeneous atmosphere. The method measures the following parameters to accurately find the visibility of an object: the attenuation factor, meaned over a distance equal to the visibility to be measured; the true contrast of the object; and the ratio of the true background brightness to the brightness of the haze in the layer of the atmosphere lying along the line of observation. J.M.S.

N75-29632 British Library Lending Div., Boston Spa (England).
OBJECTIVE METHODS OF FORECASTING LOCAL SURFACE WINDS
A. Groll [1974] 22 p refs Transl. into ENGLISH from Fach. Mitteil. (West Germany), no. 175, Nov. 1973 In ENGLISH and GERMAN
(BLL-M-23690-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 4 BLL photocopy coupons

Statistical methods are applied to long-term observations in deriving for Frankfort Airport a relationship between the observed surface wind and the surface and upper air analyses of the Deutscher Wetterdienst. The relationship is applied for 12-hr baroclinic forecasts, thus demonstrating the possibility of compiling local surface wind forecasts from the results yielded by dynamic forecasting models. Characteristics of performance are established through comparisons with the observed winds. The method may be used anywhere provided the observations are numerous enough to provide statistically significant results. Author

N75-29633 British Library Lending Div., Boston Spa (England).
ONE FEATURE OF LONG TERM OCEAN-ATMOSPHERE INTERACTION
I. A. Siskov [1974] 16 p refs Transl. into ENGLISH from Akad. Nauk Okean. Komissija, (Moscow), 1973 p 36-42 In ENGLISH and RUSSIAN
(BLL-M-23693-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 2 BLL photocopy coupons

The relation between the thermal state of the ocean and the heat content of the atmosphere is statistically analyzed. Characteristics which reflect the nonperiodic fluctuations in the thermal content of the active layer of the ocean and changes in the thermal state of a deep layer of the atmosphere are considered. The tropical zone which is the source of large scale fluctuations of the ocean and atmosphere in relation to atmospheric circulation is studied as well as other latitudinal zones. Cross correlation between the anomalies of the observed characteristics are calculated. J.M.S.

N75-29634 British Library Lending Div., Boston Spa (England).
THE ROLE OF THE TROPICAL ZONE IN PROCESSES OCCURING IN THE SYSTEM OCEAN - ATMOSPHERE - CONTINENT
V. V. Sulejkin [1974] 20 p refs Transl. into ENGLISH from Akad. Nauk Okean. Komissija (Moscow), 1973 p 3-12 In ENGLISH and RUSSIAN
(BLL-M-23692-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 2 BLL photocopy coupons

Heat flow from the tropics to the Eurasian continent via Atlantic air currents was considered. The distribution of temperature anomalies, wind speeds and heat loss from the ocean to the atmosphere were plotted across the 66 N parallel. The point of greatest temperature increase occurs at the 5 E meridian, off the coast of Scandinavia and intersecting the Norwegian Current. This area serves as a source of heat for the continent. In addition, calculations made of heat loss account for virtually the total amount of heat lost from the ocean through heat exchange and water vapor up to the height at which the vapor condenses to form clouds. Finally, correlations were made between increases in solar activity and changes in air temperature, ocean surface temperature, atmospheric pressure, and the direction of tropospheric streams. D.M.L.

N75-29635*# Scientific Translation Service, Santa Barbara, Calif.
BALLOON SOUNDING OF THE ATMOSPHERE
G. T. Afanasyev and Yu. M. Zdorik Washington NASA Jun. 1975 101 p refs Transl. into ENGLISH from the book "Aerostatnoye Zondirovaniye Atmosfery" Leningrad, Gidrometeoizdat, 1974 140 p
(Contract NASw-2483)
(NASA-TT-F-16380) Avail: NTIS HC $5.25 CSCL 04B

Methods of measuring the physical parameters of the atmosphere with balloon sounding are discussed along with the analysis of atmospheric circulation properties using the data of a balloon flight trajectories. Various balloon constructions are shown as sources of upper air data on atmospheric processes and their evolution. The basic techniques of balloon data processing are also considered. Author

N75-29636# Federal Aviation Administration, Washington, D.C. System Research and Development Service.
AIRBORNE METEOROLOGICAL INSTRUMENTATION SYSTEM AND DATA REDUCTION Final Report
J. B. McCollough and Larry K. Carpenter Mar. 1975 104 p refs
(AD-A009665; FAA-RD-75-69) Avail: NTIS HC $5.25 CSCL 04/2

The airborne meteorological data acquisition system developed for atmospheric sounding in support of research programs in aircraft noise, sonic boom, wake vorticies, etc. is described. Systems instrumentation, design, and data measured by the system are discussed. The airborne system is capable of measuring ambient temperature, dewpoint, turbulence dissipation rate, turbulence structure coefficients, radio and barometric altitude, airspeed, and winds aloft. The flight and recording profiles are numerous and range from meteorological contouring of large areas to very small areas. System improvements for data recording, wind measurement, temperature measurement in moisture, accelerometers, and instrumentation for atmospheric measurements are included. Author

N75-29637# Academy of Athens (Greece).
SOLAR ACTIVITY AND PRECIPITATION WITHIN THE ZONES OF LATITUDE 0 DEG - 40 DEG N
J. Xanthakis, C. Poulakos, and B. Tpitakis 1974 28 p refs
Avail: NTIS HC $3.75

The correlation between solar activity and precipitation is investigated for four latitude zones of the Northern Hemisphere. All stations with a long series of precipitation are considered. The mean annual precipitation in a given year corresponding to the station and minimum mean annual precipitation for the same station during the entire interval considered are calculated along with the variation of the mean zonal annual precipitation for each year. Results are presented in tabular form. J.M.S.

N75-29638*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONTROLLED GENERATION OF LARGE VOLUMES OF ATMOSPHERIC CLOUDS IN A GROUND-BASED ENVIRONMENTAL CHAMBER
Henry J. Hettel, Rosa G. dePena (Pennsylvania State Univ., University Park), and Jorge A. Pena (Pennsylvania State Univ., University Park) Washington Aug. 1975 22 p
(NASA-TM-X-3266; E-8292) Avail: NTIS HC $3.25 CSCL 04B

Atmospheric clouds were generated in a 23,000 cubic meter environmental chamber as the first step in a two part study on the effects of contaminants on cloud formation. The generation procedure was modeled on the terrestrial generation mechanism so that naturally occurring microphysics mechanisms were operative in the cloud generation process. Temperature, altitude, liquid water content, and convective updraft velocity could be selected independently over the range of terrestrially realizable clouds. To provide cloud stability, a cotton muslin cylinder 29.3 meters in diameter and 24.2 meters high was erected within the chamber and continuously wetted with water at precisely the same temperature as the cloud. The improved instrumentation which permitted fast, precise, and continual measurements of cloud temperature and liquid water content is described. Author

N75-29639# World Meteorological Organization, Geneva (Switzerland).
PRELIMINARY SCIENTIFIC RESULTS OF THE GARP ATLANTIC TROPICAL EXPERIMENT, VOLUME 2
Jan. 1975 417 p refs Prepared jointly with Intern. Council of Sci. Unions
(GATE-14-Vol-2) Avail: NTIS HC $10.50; WMO, Geneva

The papers in this volume are grouped according to the major scientific sub-programs of GATE: synoptic, convection, boundary layer, radiation, and oceanography. A summary of ship positions and distributions is given. For individual titles, see N75-29640 through N75-29684.

N75-29640 GATE Operational Control Centre, Dakar (Senegal).
THE LOW-LEVEL STRUCTURE OF AN AFRICAN DISTURBANCE DETERMINED BY AIRCRAFT RECONNAISSANCE
Clark L. Smith (Natl. Center for Atmospheric Res.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 1-7 (For availability see N75-29639 20-47)

The structure was examined of a cloud cluster of large dimensions moving westward off the West African coast and shown on satellite IR photographs. Reconnaissance was made by two short-range aircraft at three low tropospheric levels (500, 5000, and 10,000 feet), and one high level (40,000 feet). Preliminary results indicate that while a vortex at the 5,000 foot level may be traced moving towards the GATE ship array, no companion vortex at the 500 foot level was found. The rapid disintegration of the cloud cluster indicated by later satellite photographs may be related to the absence of a boundary layer system. ESRO

N75-29641 Agency for Air Navigation Safety in Africa, Dakar (Senegal).
STUDY OF THE A- AND B-SCALE DISTURBANCES PROPAGATING ACROSS THE AFRICAN CONTINENT

In WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 8-22 (For availability see N75-29639 20-47)

During the 1974 GATE experiment, the propagation of A and B scale disturbances across the African continent were studied. In particular, the following points were covered: the actual relation between the so-called easterly waves and the observed weather, A and B scale interactions, the relation between the cloud clusters, and the pressure and the wind field disturbances. The main results are in agreement with previous knowledge. The convective scale is the dominant feature of the weather disturbances over Africa; this scale is controlled mainly by local factors and by diurnal variation, giving birth to propagating cloud clusters.
ESRO

N75-29642 GATE Operational Control Centre, Dakar (Senegal).
ATMOSPHERIC DISTURBANCES OVER THE ATLANTIC GATE AREA AS SEEN FROM SATELLITE DATA
R. F. Burlutsky *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 23-40 (For availability see N75-29639 20-47)

The disturbances in the ITCZ and outside the ITCZ are discussed, based on satellite imagery and motion picture loops. It is found that the ITCZ in the Atlantic is intrinsically rather stable, and its changes are strongly related to the noon northern activity. The continental tropical and maritime air forms a discontinuity of a baroclinic type in the lower part of the troposphere above the trade wind inversion, which is responsible for much of the cyclonic activity in 16-20 N of the Atlantic and the ITCZ evolution as well. So-called easterly waves and inverted V patterns are not good descriptions of synoptic features.
ESRO

N75-29643 Academy of Sciences (USSR), Kaliningrad. Inst. of Oceanology.
AN ANALYSIS OF THE SURFACE LAYER METEOROLOGICAL PARAMETERS MEASUREMENTS ON EQUATOR
R. V. Abramov, P. I. Klimentjev, V. I. Kozlovitch, and A. N. Lila *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 41-44 refs (For availability see N75-29639 20-47)

The ratio of daily to inter-daily fluctuations of surface layer meteorological parameters was examined for measurements of three ships participating in GATE's second phase, mainly in August 1974 on the equator. Time series analysis of the parameters was performed on the assumption that dispersion of total mean consists of daily change dispersion (diurnal wave and its harmonies), interdaily change dispersion (quasi-oscillations such as natural synoptic period, cycle of index, and seasonal trend,) and occasional factors dispersion. Results are presented in tabular form.
ESRO

N75-29644 Academy of Sciences (USSR), Kaliningrad. Inst. of Oceanology.
DIURNAL AND SEMIDIURNAL VARIATIONS BY METEOROLOGICAL MEASUREMENTS ON EQUATOR
R. V. Abramov *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 45-47 refs (For availability see N75-29639 20-47)

Characteristics of both diurnal and semidiurnal variations of the meteorological values in the tropical ocean were examined for GATE phase II at the equator. The controlling role of the processes (insolation and atmospheric pressure) is discussed.
ESRO

N75-29645 Hydrometeorological Service of the USSR.
ON CHARACTERISTIC TIME SCALES OF METEOROLOGICAL FIELDS IN THE TROPICAL ATLANTIC ZONE
M. A. Petrossiants, V. N. Ivanov, V. V. Galushko, and J. A. Menshov *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 48-63 refs (For availability see N75-29639 20-47)

The time variation of meteorological fields in the Atlantic tropical zone was studied by means of spectral analysis of data from U.S.S.R. ships participating in GATE. Spectra are presented of marine boundary layer meteorological fields. Some conclusions drawn from this spectral analysis are: waves with a 4 day period, obtained for higher troposphere (Yanai-Maryama waves), show up in the marine boundary layer; spectral analysis of separate 20-day observation periods of meteoparameters reveals that narrowband wave movements changing from period to period are to be found; and the front of a tidal 12-hour wave is inclined to a meridian at an angle of approximately 350 degrees.
ESRO

N75-29646 Hydrometeorological Service of the USSR.
ON MODULATION INTERACTION OF THE VARIOUS SCALE WAVES IN THE ATLANTIC TROPICAL ZONE
V. N. Ivanov, V. V. Galushko, M. A. Menshov, and M. A. Petrossiants *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 64-73 refs (For availability see N75-29639 20-47)

The availability of close simultaneous harmonic wave motions in the atmosphere was investigated for meteorological fields of the Atlantic tropical zone; two simple models were used which include the interaction between wave motions on a different scale. One model considers the interaction between the diurnal variation and n-diurnal wave motions, exemplified by the temperature field. Another model was established for the interaction which leads to the emergence of the lateral spectral components and is associated with the wind velocity field.
ESRO

N75-29647 Central Aerological Observatory, Moscow (USSR).
ON THE LATITUDINAL VARIATION OF THE CHARACTERISTICS OF THE INVERSION LAYERS IN THE REGION OF ITCZ IN THE EAST ATLANTIC
R. S. Pastushkov *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 74-80 refs (For availability see N75-29639 20-47)

The results are discussed of regular radar convection cloud investigation and radiosounding of tropical atmosphere in the GATE program. A detailed study of the inversion layers in the tropical atmosphere was conducted, and the results were used to develop parametrization schemes for cumulus convection in the ITCZ.
ESRO

N75-29648 Hydrometeorological Centre of the USSR (Moscow).
CLOUD COVER DYNAMICS OVER THE TROPICAL ATLANTIC DURING THE GATE FIRST OBSERVING PERIOD
V. E. Godvod, J. A. Menjshov, and M. A. Petrosiants *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 81-87 refs (For availability see N75-29639 20-47)

The dynamic features of cloud clusters over the tropical Atlantic Ocean are discussed. For determination of cloud cover characteristics and dynamics, the clouds were divided into trade wind zone and ITCZ; clouds and formation within these two areas were estimated daily. Time variation diagrams are given and analyzed.
ESRO

N75-29649 GATE Operational Control Centre, Dakar (Senegal).
CLOUD CLUSTER FORMATION OVER MONSOON AFRICA
R. F. Burlutsky *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 88-98 (For availability see N75-29639 20-47)

Clouds over monsoon Africa are discussed together with related weather events. The light but steady surface pressure gradient creates a constant convergence in the lower 1-1.5 km over monsoon Africa, but is too light to cause cloud formation by itself. In this condition, mesoscale processes and their coupling with the steady general flow play a role in cloud formation and related phenomena. Some aspects of the African squall lines are considered.
ESRO

N75-29650 Hydrometeorological Centre of the USSR (Moscow).
ON THE ORDERS OF THE VALUES OF THE METEOROLOGICAL ELEMENTS OBTAINED IN THE A/B ARRAY IN THE PERIOD OF GATE
V. A. Antsipovich, A. I. Snitkovsky, and A. I. Falkovich *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 99-116 refs (For availability see N75-29639 20-47)

To obtain information on the orders of meteorological values, mean values and root mean square deviations of different physical characteristics were calculated for each phase of GATE. The probability that a normally distributed value would fall within

the interval m + or - g is about 70%. The results confirm conclusions that strong and depressed intertropical convergence zones can be distinguished by the divergence. ESRO

N75-29651 Main Geophysical Observatory, Leningrad (USSR).
ON A PRINCIPLE OF VALIDATION OF THE METEOROLOGICAL OBSERVATION RESULTS IN GATE-74
D. P. Bespalov and T. P. Svetlova *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 117-119 (For availability see N75-29639 20-47)

The different effects of the location of meteorological instruments on their readings is discussed together with the necessity of validating the results. A method is described for estimating the correlation of observation results from Soviet ships during GATE-74 which uses an analysis of the differences between the space field of the averaged element value and the measured values on every ship averaged for the same time period. ESRO

N75-29652 GATE Operational Control Centre, Dakar (Senegal).
THE QUALITY OF UPPER AIR OBSERVATIONS IN THE GATE B-AREA
David R. Rodenhuis (Maryland Univ., College Park) and Donald T. Acheson (Natl. Oceanic and Atmospheric Admin., Washington, D. C.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2, Jan. 1975 p 120-144 refs (For availability see N75-29639 20-47)
(Grant NSF GA-32778)

Upper air observations are summarized, and methods of obtaining upper wind measurements such as the Omega and VLF navigation systems are described and their shortcomings discussed. Intercomparisons of the different methods (including radiosondes and balloons) are reported. Since the results are incomplete, no firm conclusions can be drawn about the quality or quantity of upper air data in the GATE-B area. ESRO

N75-29653 GATE Operational Control Centre, Dakar (Senegal).
OBSERVATIONS ON CONVECTIVE CLOUDS OVER THE TROPICAL ATLANTIC
Helmut K. Weickmann (Natl. Oceanic and Atmospheric Admin., Boulder, Colo.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 145-155 (For availability see N75-29639 20-47)

Three cloud conditions over the tropical Atlantic are described: undisturbed conditions, cloud systems of cloud clusters, and cloud systems of the intertropical convergence zones. The cycle of convection over the tropical ocean is discussed, and microphysical observations which include nuclei observations and optical phenomena seen during flight missions are reported. ESRO

N75-29654 GATE Operational Control Centre, Dakar (Senegal).
ON MICROSTRUCTURE OF CLOUDS IN THE EASTERN ZONE OF THE ATLANTIC
A. M. Borovikov (Central Aerological Obs., Moscow), I. P. Mazin (Central Aerological Obs., Moscow), A. I. Nevzorov (Central Aerological Obs., Moscow), and V. F. Shugaev (Central Aerological Obs., Moscow) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 156-159 (For availability see N75-29639 20-47)

Research flights during GATE by IL-18 aircraft obtained data relating to cloud microstructure. A number of peculiarities such as phase structure, optical density of clouds, and superlarge cloud particles are noted; their role in the microstructure of clouds is discussed. ESRO

N75-29655 Virginia Univ., Charlottesville.
ON THE STRUCTURE AND ORGANIZATION OF CLOUDS IN THE GATE AREA
J. Simpson and R. H. Simpson *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 160-167 ref (For availability see N75-29639 20-47)

The structure and life cycle of clouds in the GATE area are discussed and compared with similar cumulus clouds over the Western Atlantic and Florida. It is shown that for towers (of cumulus clouds) to reach the tropopause, there must be some kind of strong forcing. ESRO

N75-29656 Academy of Sciences (USSR), Kaliningrad. Inst. of Oceanology.
ON THE STRUCTURE OF THE CUMULUS CLOUDS AT THE EQUATOR IN CONNECTION WITH METEOROLOGICAL CONDITIONS ACCORDING TO THE STEREOPHOTOGRAPHIC MEASUREMENTS ON BOARD THE R/V AKADEMIK KURCHATOV
E. V. Zhurba and Y. A. Romanov *In* WMO Prelim. Sci. Results of the GARP Altantic Trop. Expt. Vol. 2 Jan. 1975 p 168-174 refs (For availability see N75-29639 20-47)

Stereophotogrammetric measurements of cumulus clouds were made three times a day. The geometric parameters of the clouds received on 24 stereopairs for the period from 7 to 13 July 1974 (when the ship was at the equator) are analyzed. The results of cloud morphological parameters are given and their characteristic features discussed. ESRO

N75-29657 Bonn Univ. (West Germany).
INVESTIGATION OF THE STRUCTURE OF PRECIPITATION AREAS
Eberhard Ruprecht *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 175-176 (For availability see N75-29639 20-47)

Qualitative results deduced from radar observations and precipitation measurements on board the German R.V. Planet are given. The radar echoes of cloud clusters obtained during the GATE period are compared to those obtained during APEX 1969; the radar index of the former was found to be higher and the echo area larger. Precipitation measurements agreed well with those for similar cloud clusters in the West Pacific. ESRO

N75-29658 Central Aerological Observatory, Moscow (USSR).
RADAR INVESTIGATIONS OF EVOLUTION OF CLOUDS IN THE EASTERN ATLANTIC
A. B. Shupiatsky, A. I. Korotov, V. D. Menshenin, R. S. Pastushkov, and M. Jovasevic (Federal Hydrometeorol. Inst., Belgrade) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 177-187 ref (For availability see N75-29639 20-47)

Radar observations of cloud development during GATE were made from the R.V. Professor Vize. A short generalization of the observational results and their preliminary analysis is given. The radar data was considered on three scales (macroscale, mesoscale, and evolution) and also depended on the position of the ITCZ. The evolution of clouds is described, and the microstructure of cumulonimbus clouds in the ITCZ is discussed. ESRO

N75-29659 GATE Operational Control Centre, Dakar (Senegal).
PRELIMINARY ANALYSIS OF A SELECTIVE SAMPLE OF GATE SHIP AND AIRCRAFT DATA
William M. Gray (Colorado State Univ., Fort Collins) and Donald Wylie (Wisconsin Univ.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 188-192 refs (For availability see N75-29639 20-47)

Preliminary results of an early analysis of upper air temperature and humidity in the GATE area in comparison with values of similar weather patterns in the West Indies and West Pacific are presented. General information on the magnitude of convection induced humidity variations in downdrafts around the B-scale array as measured by various aircraft are given. Statistical results of ship observations on vertical gradients of potential-temperature, mixing ratio, and wind direction and speed in the lowest 800 m are also indicated. ESRO

N75-29660 Central Aerological Observatory, Moscow (USSR).
ON THE EFFECTS OF THERMODYNAMIC CONDITIONS ON THE EVOLUTION OF CONVECTIVE CLOUDS IN THE TROPICAL ZONE OF EAST ATLANTIC
R. S. Pastushkov and A. B. Shupjatsky *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 193-197 refs (For availability see N75-29639 20-47)

Preliminary results obtained by one hourly radar and six or three-hourly upper air soundings during the GATE period are presented. The statistical correlation was investigated between the maximum height of radar echo, maximum radar reflection, and mean horizontal scale of cloud cluster on one hand, and the total energy of atmospheric instability, deviation of total

moisture content from its mean phase value, height of subinversion layer, and the wind shear in the cloud layer on the other hand. Results are discussed. ESRO

N75-29661 GATE Operational Control Centre, Dakar (Senegal).
RAPID STRUCTURAL CHANGES IN AN ASYMMETRICAL TROPICAL DEPRESSION
Edward J. Zipser (Natl. Center for Atmospheric Res.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 198-202 (For availability see N75-29639 20-47)

Aircraft observations during the GATE period of a cloud mass associated with the center of a tropical depression are described. It was noted that the cyclone center in the mid-troposphere was displaced about 2 degrees of longitude to the west of the cyclonic center in the low troposphere, with heavy rainfall between the two centers. The low level circulation changed rapidly with time, in direct association with similar rapid changes in the distribution of convection clouds and weather. ESRO

N75-29662 GATE Operational Control Centre, Dakar (Senegal).
ON THE WIND, TEMPERATURE, AND HUMIDITY FIELDS IN THE VICINITY OF AN EAST-WEST LINE OF SHOWERS
Margaret A. LeMone (Natl. Center for Atmospheric Res.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 203-211 ref Sponsored in part by NSF (For availability see N75-29639 20-47)

On 3 August 1974, GATE aircraft flew repeated north-south, 50-60 nm lines through an east-west ITCZ band. Northwesterly winds to the north of the line and southwesterly winds to the south of the line resulted in convergence in the subcloud layer as high as 0.001 sec to the minus 1 power. Results of a preliminary analysis of the wind, temperature, and humidity fields measured by the aircraft are presented. ESRO

N75-29663 GATE Operational Control Centre, Dakar (Senegal).
CASE STUDY OF THE PHYSICAL STRUCTURE OF INDIVIDUAL CUMULO NIMBUS (MISSION 226-4, TYPE 8B2)
A. M. Borovikov (Central Aerological Obs., Moscow), I. P. Mazin (Central Aerological Obs., Moscow), Y. Melnichuk (Central Aerological Obs., Moscow), and P. Willis (Natl. Oceanic and Atmospheric Admin.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 212-216 (For availability see N75-29639 20-47)

Numerous penetrations of cumulonimbus clouds from evolution to decay were made to obtain data on their physical structure. A preliminary analysis was made of the wind field with a cloud, the temperature, and microphysical characteristics such as optical density. Conclusions are drawn. ESRO

N75-29664 GATE Operational Control Centre, Dakar (Senegal).
IDENTIFICATION, TRACKING, AND SOURCES OF SAHARAN DUST: AN INQUIRY USING SMS
David W. Martin (Wisconsin Univ., Madison) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 217-224 refs (For availability see N75-29639 20-47) (Grant NSF GA-40494)

To define conditions for detection of over-land and over-water dust in visible and infrared pictures of the synchronous meteorological satellite, observations of the sources of Sahara dust were made. Prominent over-water dust clouds seen in visible pictures were located on matching infrared pictures and followed back in time (in both infrared and visible pictures) across the coast and into West Africa. The source areas are identified, and three mechanisms for dust production are suggested. ESRO

N75-29665 National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
PRELIMINARY RESULTS OF ACOUSTIC ECHO SOUNDING OF THE MARINE BOUNDARY LAYER DURING GATE
P. A. Mandics, F. F. Hall, and E. J. Owens *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 225-228 (For availability see N75-29639 20-47)

An acoustic echo sounder was installed aboard the NOAA ship 'Oceanographer' to study the lower layers of the tropical marine atmosphere during GATE. Acoustic backscatter produced by temperature inhomogeneities (approximately of the size of one-half the acoustic wavelength) provided information about the vertical structure of the atmosphere. The sounder also recorded vividly depicted changes in the atmospheric boundary layer caused by mesoscale phenomena, and these are described. ESRO

N75-29666 Mainz Univ. (West Germany). Inst. fuer Meteorologie.
THE COOL SKIN OF THE OCEAN c48
Hartmut Grassl and Hans Hinzpeter *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 229-236 refs (For availability see N75-29639 20-47)

The temperature difference between the ocean surface and a few centimeters below the surface was continuously recorded onboard the German R.V. 'Planet' during phase III of GATE. The ocean surface temperature was measured by infrared radiometers, while the water below it was measured using resistance thermometers. The main factor governing the reliability of the measurements of the cool skin of the ocean was the calibration accuracy of the thermometers. The methods of measuring and calibrating, and the differences in temperature so recorded are discussed. ESRO

N75-29667 Hydrometeorological Service of the USSR.
TURBULENT CHARACTERISTIC MEASUREMENTS IN THE MARINE BOUNDARY LAYER DURING GATE
V. V. Galushko, V. N. Ivanov, I. V. Nekrasov, V. P. Pudov, A. V. Rostkov, and A. A. Shushkov *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 237-261 refs (For availability see N75-29639 20-47)

Preliminary results of turbulent characteristic measurements in the marine boundary layer collected onboard the R.V. 'Prof. Zubov' during GATE are presented. The main parameters of wind speed and difference between water and air temperature are given, as well as the temperature spectra and cospectra. The measurements are compared with similar experiments over land. ESRO

N75-29668 Hamburg Univ. (West Germany). Inst. fuer Meteorologie.
BULK AERODYNAMIC DESCRIPTION OF TURBULENT FLUXES AT THE SURFACE WITH AND WITHOUT PRECIPITATION
J. Wucknitz, L. Kruegermeyer, L. Hasse, G. Kruspe, and M. Dunckel *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 262-266 refs (For availability see N75-29639 20-47)

Transports through the air-sea interface for the GATE area were obtained using the bulk aerodynamic method. The fluxes of momentum and latent and sensible heat are described as a function of mean parameters, while the bulk transfer coefficients are functions of the turbulent state of the surface layer. Checks for systematic variations of the transfer coefficients with and without rain are reported. It is concluded that no significant differences occur. ESRO

N75-29669 Hamburg Univ. (West Germany). Inst. fuer Meteorologie.
PRELIMINARY REPORT ON DETERMINATION OF FLUXES BY DIRECT AND PROFILE METHOD DURING INTERCOMPARISON 2A
L. Hasse, J. Wucknitz, G. Kruspe, V. N. Ivanov (Inst. of Exptl. Meteorol., USSR), A. A. Shuskov (Inst. of Exptl. Meteorol., USSR), I. V. Nekrasov (Moscow Univ.), J. A. Volkov (Acad. of Sci., Moscow), B. M. Koprov (Acad. of Sci., Moscow), L. G. Elagina (Acad. of Sci., Moscow), J. Mueller-Glewe (Mainz Univ.) et al *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 267-277 refs (For availability see N75-29639 20-47)

Intercomparison II A (19-20 Aug. 1974) was scheduled to countercheck determinations of turbulent vertical transports of water vapor, momentum, and sensible heat by the direct eddy correlation technique and from the aerodynamic profile method. Details of the experimental setup are given, and the weather conditions described; vertical, humidity, and temperature gradients, spectral data, momentum flux, and sensible heat and water vapor fluxes are discussed. ESRO

N75-29670 GATE Operational Control Centre, Dakar (Senegal).
AIRCRAFT MEASUREMENTS OF REFLECTED SOLAR

RADIATION ANGULAR AND SPECTRAL CHARACTERISTICS IN GATE PROGRAM. PART 1: REFLECTION INDICATRIX

V. I. Korzov (Main Geophys. Obs., Leningrad) and N. E. Ter-Markaryants (Main Geophys. Obs., Leningrad) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 278-283 refs (For availability see N75-29639 20-47)

Within the GATE program, the measurements of the angular reflected solar radiation distribution were taken in 10 bands of the 0.5-1.5 micrometers spectral region from the IL-18 MGO aircraft by means of a two channel scanning radiometer. From the observational data, the relative angular distribution of the reflected radiation and the relative spectral brightness were determined. Over the ocean, under cloudless conditions, the angular characteristics of reflection were measured at various aerosol contents in the atmosphere. From the data obtained, reflection models were constructed in different azimuth directions for various flight altitudes, wavelengths, and sun's altitude. ESRO

N75-29671 GATE Operational Control Centre, Dakar (Senegal).
AIRCRAFT MEASUREMENTS OF REFLECTED SOLAR RADIATION ANGULAR AND SPECTRAL CHARACTERISTICS IN GATE PROGRAM. PART 2: THE SPECTRAL ALBEDO

V. I. Korzov (Main Geophys. Obs., Leningrad) and N. E. Ter-Markaryants (Main Geophys. Obs., Leningrad) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 284-289 ref (For availability see N75-29639 20-47)

Within the GATE program, albedo measurements in 10 bands of the 0.5-1.5 micrometers spectral region were taken from an IL-18 (MGO) aircraft at various flight altitudes using a spectral albedometer. Preliminary observation data on the spectral albedo for the sea surface and for the 'atmospheric layer-underlying surface' system were obtained on cloudless days. It was found that the spectral albedo changed significantly with flight altitude, wavelength, and different aerosol composition of the atmosphere. ESRO

N75-29672 Academy of Sciences (USSR), Moscow.
AEROSOL AND WATER VAPOUR INFLUENCES ON DIRECT SOLAR RADIATION FLUXES IN THE CENTRE OF EQUATORIAL ATLANTIC

E. M. Feigelson, V. N. Kapustin, G. N. Martianova, and B. A. Semenchenko *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 290-295 refs (For availability see N75-29639 20-47)

The variability of direct solar radiation is considered in relation to atmospheric aerosol and water vapor contents. Possible sources of direct solar radiation changes are discussed. Shipboard measurements in the equatorial Atlantic indicate that the major changes of direct solar radiation fluxes during the period of measurement are due to aerosols. ESRO

N75-29673 GATE Operational Control Centre, Dakar (Senegal).
ON THE RELATION BETWEEN OPTICAL AND AEROSOL CHARACTERISTICS OF THE EAST ATLANTIC ATMOSPHERE

A. G. Laktionov, V. N. Adnashkin, V. M. Kopchenov, A. Y. Semova, and O. B. Stsiborskiy *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 296-298 refs (For availability see N75-29639 20-47)

The relation was investigated between optical and aerosol characteristics of the equatorial atmospheric surface air layer and turbidity of direct solar radiation in the cloudless atmosphere. The measurement methods are noted, and a preliminary assessment of the variability of both atmosphere, optical, and aerosol characteristics is made. The correlation between large particle concentrations with the change in wind direction allows the assumption that the particles are of continental-African origin. ESRO

N75-29674* GATE Operational Control Centre, Dakar (Senegal).
INFRARED RADIATION BUDGET OF THE HARMATTAN HAZE

P. M. Kuhn (Natl. Oceanic and Atmospheric Admin., Boulder, Colo.) and H. K. Weickmann (Natl. Oceanic and Atmospheric Admin., Boulder, Colo.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 299-323 refs Sponsored in part by Natl. Oceanic and Atmospheric Admin. and NASA (For availability see N75-29639 20-47)

Infrared in situ observations of the West African Harmaltan Haze during the 1974 GATE field phase were conducted to determine the radiative properties of the tropospheric phenomenon and to develop a calculation model for radiative transfer through the haze. Radiometric observations of the dust haze were analyzed for haze infrared transmission. Infrared and tropospheric cooling rates are given together with the haze volume absorption rate. ESRO

N75-29675 Rosenstiel School of Marine and Atmospheric Sciences, Miami, Fla.
FLUCTUATIONS IN THE VERTICAL STRUCTURE OF THE ATLANTIC EQUATORIAL UNDERCURRENT c48

Z. R. Hallock and K. V. Moroshkin (Acad. of Sci. (USSR), Kaliningrad) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 324-327 (For availability see N75-29639 20-47)

During the second phase of GATE, profiling current meter (PCM) observations were coordinated on board the R/V 'Academician Kurchatov'. Radar observations were made concurrently with the PCM observations to determine ship drift relative to a reference buoy. Profiles of current velocity and temperature vs depth were made to 600 m every 6 hours between 29 July and 12 August 1974. The 43 profiles obtained are analyzed and fluctuations noted. ESRO

N75-29676 Articheskii i Antarkticheskii Nauchno- Issledovatelskii Institut, Leningrad (USSR).
ON THE REALITY OF EXISTENCE OF SPORADIC LARGE-SCALE EDDY FORMATIONS IN THE OCEAN c48

N. I. Tyabin and B. A. Sleptsov-Shevlevich *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 328-343 (For availability see N75-29639 20-47)

The existence of rather high, sporadic large-scale eddies in the tropical zone of the Atlantic Ocean is discussed, and their origins and characteristics explained. Grounds for the formation of eddies under certain synoptic conditions are advanced, and observations during GATE are analyzed and described. The temperature distribution in the eddies is considered in some depth; it is concluded that eddies could result from atmospheric circulation generated by quasi-stationary pressure formations. ESRO

N75-29677 National Oceanic and Atmospheric Administration, Boulder, Colo.
OCEAN CURRENTS OBSERVED BY NOAA SHIP OCEANOGRAPHER DURING GATE c48

Richard E. Newell *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 344-355 (For availability see N75-29639 20-47)

Ocean current data are presented in the form of progressive vector diagrams. A brief discussion of their collection, processing, and interpretation is included. ESRO

N75-29678 Articheskii i Antarkticheskii Nauchno- Issledovatelskii Institut, Leningrad (USSR).
MAIN STATISTICAL CHARACTERISTICS OF CURRENTS IN THE NORTHERN PART OF B-SCALE c48

O. A. Vladimirov, I. D. Zikov, and I. N. Koltakov *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 356-362 refs (For availability see N75-29639 20-47)

Statistical and spectral analyses were conducted for ocean currents in the northern part of the B scale. The data is presented in the form of tables, and tentative conclusions concerning the vertical structure are made. ESRO

N75-29679 Articheskii i Antarkticheskii Nauchno- Issledovatelskii Institut, Leningrad (USSR). Oceanographic Inst.
ON REPRESENTATIVITY OF WAVE MEASUREMENTS MADE BY SOVIET SHIPS DURING TROPICAL EXPERIMENT-74 c48

I. N. Davidan, U. V. Oljunin, and U. A. Trapeznikov *In* WMO

Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 363-367 refs (For availability see N75-29639 20-47)

A wave meter is briefly described, and statistical summaries of observation periods, ship positions, total number of measurements, their average time durations, and maximum wave heights are presented. Spectral analyses made of synchronized wave records are described. ESRO

N75-29680 Oregon State Univ., Corvallis. Dept. of Oceanography.

ANOMALOUS VARIATIONS IN TEMPERATURE-SALINITY RELATIONSHIPS AT GATE STATION 7 **c48**

C. Koblinsky and P. L. Grose (Natl. Oceanic and Atmospheric Admin., Washington, D. C.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 368-371 (For availability see N75-29639 20-47)

Routine profiles of conductivity, salinity, and temperature as a function of depth were measured. The relationship between temperature and salinity was observed to change in a systematic but anomalous manner. The results are discussed, and the role of oceanic circulation considered. ESRO

N75-29681 Kiel Univ. (West Germany). Inst. fuer Meereskunde.

VARIATIONS OF TEMPERATURE, SALINITY AND CURRENTS IN THE MIXED LAYER AND THE THERMOCLINE (PRELIMINARY RESULTS) **c48**

G. Siedler and W. Zenk *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 372-378 (For availability see N75-29639 20-47)

The type of variability of temperature, salinity, and currents in the oceanic mixed layer, and the thermocline which was observed in the C-scale region nested in the B-area during phase III of GATE are described. A preliminary analysis of results is made with reasons advanced for the variations. ESRO

N75-29682 Hydrometeorological Scientific Research Center (USSR).

ON SOME QUESTIONS OF INTERACTION BETWEEN THE OCEAN AND ATMOSPHERE IN THE NORTHERN PART OF A/B SCALE **c48**

V. S. Krasjuk *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 379-386 ref (For availability see N75-29639 20-47)

Investigative results of the processes of the heat entrance on the ocean surface and generation of the thermal structure of the ocean upper layer are presented. Among the aspects discussed are the solar radiation on the surface, the main components of the heat balance of the ocean surface, the characteristics of the thermal structure of water, and the heat content of different ocean layers. ESRO

N75-29683 Academy of Sciences (USSR), Moscow.

THE EXPERIMENT OF INVESTIGATION OF THE DYNAMICS OF THE UPPER OCEAN LAYER AT THE EQUATOR **c48**

V. D. Egorikhin, V. M. Radikevich, and V. N. Kudryavtsev *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 387-391 refs (For availability see N75-29639 20-47)

An experiment is described to measure ocean currents in the upper 10 m by using navigation and current meters mounted on small buoys fastened to main buoys. The majority of measurements indicate a complex current structure in the upper layer of the ocean which is probably related to vertical fluctuations of the Lomonosov current. The turbulent diffusion in the surface layer is also considered. ESRO

N75-29684 National Oceanic and Atmospheric Administration, Miami, Fla. Atlantic Oceanographic and Meteorological Labs.

PRELIMINARY ANALYSIS OF OCEAN INTERNAL WAVE OBSERVATIONS BY ACOUSTIC SOUNDINGS **c48**

Feodor Ostapoff, John Proni, and Ron Sellers *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 392-397 refs (For availability see N75-29639 20-47)

Servicing techniques required to observe perturbations at the bottom of the mixed-layer and in the upper thermocline are described briefly. Results of an intercomparison experiment between the acoustic record and a corresponding STD time series are presented. An example is given which illustrates the application of the data to the analysis of the observations obtained during the joint roving operations of various ships. ESRO

N75-29685# Stockholm Univ. (Sweden). Inst. of Meteorology.

CALCULATIONS OF THE MEAN REGIONAL DISPERSION OF A RADIOACTIVE GAS EMITTED FROM A CONTINUOUS SOURCE

Christer Persson 16 Oct. 1974 17 p refs Sponsored jointly by Res. Inst. of Swed. Natl. Defence and Atomic Energy Co. of Sweden

(AC-29) Avail: NTIS HC $3.25

The mean dispersion over distances of the order of 1000 kilometers was estimated with the aid of a statistical treatment of computed geostrophic trajectories and simplified vertical diffusion calculations based on the eddy diffusivity theory. Author (ESRO)

N75-29686# Stockholm Univ. (Sweden). Inst. of Meteorology.

VERTICAL STRUCTURE OF HEMISPHERIC TEMPERATURE SPECTRAL COMPONENTS

Ferdinand Baer Oct. 1974 42 p refs

(Grant NSF GA-36409)

(DM-13) Avail: NTIS HC $3.75

Two months of hemispheric temperature data at 14 pressure levels are analyzed into their spectral components in each surface. Utilizing covariance matrix techniques, the vertical eigenvectors of this data sample are established for each horizontal spectral component and for various combinations of them. These functions are in turn compared to the theoretical eigenfunctions which satisfy the conservation of available potential vorticity. The scale characteristics of the data functions were sought and statistics of available potential energy in each vertical mode are described in terms of the horizontal scale index. Author (ESRO)

N75-29687# Stockholm Univ. (Sweden). Inst. of Meteorology.

THE SPECTRAL BALANCE EQUATION

Ferdinand Baer Jan. 1975 29 p refs

(Grant NSF GA-36409)

(DM-14) Avail: NTIS HC $3.75

The formula for generating stream function coefficients in terms of height coefficients was analyzed; the height coefficients are developed from the linear balance equation wherein the dependent variables are expanded in solid harmonics. Results show that for non-zonal waves the kinetic energy derived increases with increasing scale. A set of basic functions was consequently developed in which the geopotential field may be expanded to yield energetically consistent stream coefficients and simultaneously satisfy the balance condition. A relationship was determined whereby stream coefficients may be determined from the height coefficients of a solid harmonic expansion. These coefficients are shown to be consistent with those previously derived for the zonal case. Author (ESRO)

N75-29688# Physics Lab. RVO-TNO, The Hague (Netherlands).

VISIBILITY ON THE ATLANTIC OCEAN AND THE NORTH SEA

A. A. vanMeeteren Oct. 1974 18 p refs

(PHL-1974-32; TDCK-65376) Avail: NTIS HC $3.25

Report surveys from Atlantic Ocean and North Sea weather stations were studied to determine visual ranges. Visibility data are given for representative stations. Author (ESRO)

N75-29689# European Space Research Organization, Paris (France).

STUDY OF METEOROLOGICAL DATA PROCESSING METHODS

G. F. Block, comp., H. A. Kellner, comp. (European Space Operations Center), A. Krogvig, comp. (European Space Operations Center), D. E. Miller, comp. (Meteorol. Office, Engl.), C. Pastre, comp. (Meteorol. Natl., France), L. Bergeron, comp. (CNES), and F. Breton, comp. (CNES) Sep. 1972 112 p refs

(ESRO-SP-85) Avail: NTIS HC $5.25

The potential applications of observations obtained from a

geostationary meteorological satellite are reviewed along with the data processing tasks of a supporting ground facility in preparing the various classes of input data for operational use by the Meteorological Services. The handling of IR and visible data generated by a spin-scan radiometer is discussed, the following techniques are considered: the correction of imperfections in the raw data; the generation of earth location information from spacecraft orbit and attitude, and projection conversion to the extraction of quantitative meteorological data such as winds and sea surface temperatures. The workloads imposed by the processing of sounding data, operation of a system of data collection from remote platforms, and the dissemination of images and derived data are outlined. Emphasis is placed on the description of those data processing methods currently in use, their probable development, and estimation of the magnitude of the associated computer workload at the ground facility.
Author (ESRO)

N75-29690# Wisconsin Univ., Madison. Inst. for Environmental Studies.
WORLD CLIMATE AND WORLD FOOD SYSTEMS 1: HEYUPPSKERA, AN HEURISTIC MODEL FOR HAY YIELD IN ICELAND
Reid A. Bryson Sep. 1974 17 p refs
(Grant NSF GI-29731)
(PB-240870/6; IES-22; NSF/RA/E-74-053) Avail: NTIS HC $3.25 CSCL 04B

A methodology is examined for exploring the roles of fertilizer and climate in their quantitative effect on hay yield in Iceland. Iceland was chosen because it is representative of the large subarctic area which has been undergoing maximal climatic changes over the last few decades. The initial assumptions of the study were primarily that hay yields in Iceland are warmth limited: fertilizer should increase yield, as should warm summers, but cold winters should reduce yield. The close fit of the model estimates to the observed yield indicates that these assumptions are largely justified except for the unexpected result that additional amounts of fertilizer applied after 1957 have actually diminished yield, either by increasing disease or increasing susceptibility to climatic damage. GRA

N75-29691# Wisconsin Univ., Madison. Inst. for Environmental Studies.
WORLD CLIMATE AND WORLD FOOD SYSTEMS 3: THE LESSONS OF CLIMATIC HISTORY
Reid A. Bryson Nov. 1974 19 p refs
(Grant NSF GI-29731)
(PB-240872/2; IES-27) Avail: NTIS HC $3.25 CSCL 04B

The major lessons of climatic history cited include: (1) climate is not fixed; (2) climate tends to change rapidly rather than gradually; (3) cultural changes usually accompany climatic changes; (4) when the high latitudes cool, the monsoons tend to fail; (5) cool periods of earth history are periods of greater climatic instability. Evidence is presented for these findings and implications for the future are discussed. Present climatic trends are seen as continuing through the rest of the century with the climate becoming more unstable. The likelihood of a climatically related disaster occurring within a decade is seen as being great. GRA

N75-29692# Wisconsin Univ., Madison.
WORLD CLIMATE AND WORLD FOOD SYSTEMS 4: A SURVEY OF THE STATE OF THE ART IN METEOROLOGICAL LONG RANGE STATISTICAL FORECASTING Inst. for Environmental Studies.
Thomas B. Starr Nov. 1974 22 p refs
(Grant NSF GI-29731)
(PB-240873/0; IES-29; NSF/RA/E-74-055) Avail: NTIS HC $3.25 CSCL 04B

An overview is presented of the statistical models and methods currently being used to make long-term large-scale, forecasts. Basic assumptions which must hold for proper validation of the methods, and some of the problems encountered in interpretation of results are discussed. The methods discussed include the univariate multiple regression; the multivariate techniques of canonical correlation and discriminant analysis; and methods for the economical characterization of spatial fields. The coupling of these methods to multivariate techniques for the purpose of forecasting and spectral decomposition techniques are also discussed. GRA

N75-29693# Wisconsin Univ., Madison. Inst. for Environmental Studies.
WORLD CLIMATE AND WORLD FOOD SYSTEMS 5: THE SPECIAL MODEL; HISTORY AND PRESENT STATE OF THE ART
Thomas J. Phillips Nov. 1974 15 p refs
(Grant NSF GI-29731)
(PB-240874/8; IES-30) Avail: NTIS HC $3.25 CSCL 04B

Spectral analysis is seen as an increasingly utilized means of learning more about the interconnectedness of energy sources and sinks and the wave components of spectral models with an emphasis on the insights to atmospheric behavior that they have provided. Early work is reviewed as are barotropic models, baraclinic models, and primitive equation models. Spectral models are seen as having been limited, with few exceptions, to highly idealized low resolution experiments. With the advent of transform methods, however, more realistic and efficient numerical experiments are seen as being possible. The advantages are given of spectral approaches over finite difference approaches. GRA

N75-29694# National Climatic Center, Asheville, N.C.
SUMMARY OF SYNOPTIC METEOROLOGICAL OBSERVATIONS FOR GREAT LAKES AREAS. VOLUME 2: LAKE HURON AND GEORGIAN BAY
Jan. 1975 250 p
(COM-75-10364/8; NOAA-75022604) Avail: NTIS HC $7.50 CSCL 04B

The volume is one in a series of four intended to serve as a large scale climatic guide to thirteen major Great Lakes areas. Consisting entirely of tables, this volume contains data on weather occurrence by wind direction; ceiling heights; cloud amounts; visibility; relative humidity by air temperature; occurrence of fog; sea height; wave height versus wave period; monthly and annual percent frequencies and means of sea surface temperature; and monthly and annual sea level pressures. GRA

N75-29695# National Climatic Center, Asheville, N.C.
SUMMARY OF SYNOPTIC METEOROLOGICAL OBSERVATIONS FOR GREAT LAKES AREAS. VOLUME 3: LAKE MICHIGAN
Jan. 1975 170 p
(COM-75-10365/5; NOAA-75030504) Avail: NTIS HC $6.25 CSCL 04B

For abstract, see N75-29694.

N75-29696# National Climatic Center, Asheville, N.C.
SUMMARY OF SYNOPTIC METEOROLOGICAL OBSERVATIONS FOR GREAT LAKES AREAS. VOLUME 4: LAKE SUPERIOR
Jan. 1975 256 p
(COM-75-10366/3; NOAA-75030505) Avail: NTIS HC $8.50

The volume is one in a series of four intended to serve as a large scale climatic guide to thirteen major Great Lakes areas. Consisting entirely of tables, this volume contains data on weather occurrence by wind-direction and hour; mean wind speed by direction and hour; mean cloud amounts by wind direction; ceiling heights; cloud amounts; visibility; relative humidity by air temperature; wind direction by air temperature; means extremes and percentiles of air temperature; occurrence of fog; sea height; wave height versus wave period; monthly and annual percent frequencies and means of sea surface temperature; and monthly and annual sea level pressures. GRA

N75-29697# Army Foreign Science and Technology Center, Charlottesville, Va.
MICROPHYSICAL CHARACTERISTICS OF LOCAL FOGS
P. N. Krasikov and G. A. Chikirova 20 May 1974 23 p refs Transl. into ENGLISH from Tr. Gl. Geofiz. Observ. (Leningrad), no. 57, 1956 p 88-100
(AD-A006075; FSTC-HT-23-0361-74) Avail: NTIS CSCL 04/2

A study of the microphysical characteristics of local fogs showed that radiation fogs form during anticyclone weather during relatively calm conditions. Humidity in fogs is almost always

100% and droplet size depends on the length of a fog; short fogs contain small droplets, and prolonged fogs contain larger ones. Evaporation fogs depend during sub-zero temperatures on the temperature and density. GRA

N75-29698# National Environmental Satellite Service, Washington, D.C.
A COMPARISON OF INFRARED IMAGERY AND VIDEO PICTURES IN THE ESTIMATION OF DAILY RAINFALL FROM SATELLITE DATA
Walton A. Follansbee and Vincent J. Oliver Jan. 1975 20 p refs
(COM-75-10435/6; NOAA-TM-NESS-62) Avail: NTIS HC $3.25 CSCL 04B

An empirical method of estimating 24-hr. rainfall in the tropics and subtropics using both satellite video pictures and infrared imagery was tested to determine whether comparable results could be obtained. This method was tested for Alabama, Georgia, and South Carolina for the months of July, August, and September 1973. The infrared data set provided approximately the same degree of accuracy as the video data set, and the mean of the estimates from the two data sets provided additional accuracy. Seven-day-running totals of observed rainfall are given. The rainfall estimation technique applies best to humid tropical convective storm areas. GRA

N75-29699# National Oceanic and Atmospheric Administration, Rockville, Md. Federal Coordinator for Marine Environmental Prediction.
FEDERAL PLAN FOR ENVIRONMENTAL DATA BUOYS Report for Fiscal Year 1974
Nov. 1974 45 p
(COM-75-10511/4; NOAA-75040304) Avail: NTIS; SOD HC CSCL 04B

A phased schedule for the deployment of 36 environmental data buoys to provide surface meteorological observations and limited surface and subsurface oceanographic data under all weather conditions is presented. A technological opportunity is provided by the buoys to enhance ocean monitoring capability and to support the rational development of the ocean and its resources. Details of the technological development effort to achieve optimum capability and reliability of buoy systems and components is included. GRA

N75-29700# National Oceanic and Atmospheric Administration, Boulder, Colo. Weather Modification Program Office.
SPATIAL AND TEMPORAL VARIATIONS OF THE TURBULENT FLUXES OF HEAT, MOMENTUM, AND WATER VAPOR OVER LAKE ONTARIO DURING IFYCL
B. R. Bean, C. G. Emmanuel, R. O. Gilmer, and R. E. McGavin Feb. 1975 62 p
(COM-75-10481/0; NOAA-TR-ERL-313-WMPO-5; NOAA-75040201; NOAA-TR-313-WMPO-5) Avail: NTIS; SOD HC as C55.13:ERL313-WMPO5 CSCL 04B

The time series of wind, temperature, and water vapor were recorded at heights ranging from 18 to 300 m above the surface of Lake Ontario. The time series records are found to display a highly intermittent nature. IR lake surface temperatures show cold regions along the north shore, presumably due to strong upwelling, while the center and south shore regions of the lake were of the order of 12 to 15C. The turbulent, flux quantities of momentum, heat, and water vapor were obtained by the eddy correlation technique and their spectra were determined at several locations over the lake surface for three-minute sampling lengths. GRA

N75-29701# Army Cold Regions Research and Engineering Lab., Hanover, N.H.
MODEL STUDIES OF DRIFTING SNOW PATTERNS AT SAFEGUARD FACILITIES IN NORTH DAKOTA
Darryl J. Calkins Nov. 1974 20 p refs
(AD-A006018; CRREL-TR-256) Avail: NTIS CSCL 15/3

A model study of simulated drifting snow was conducted in a hydraulic flume. Various structures at the Safeguard facilities in North Dakota were modeled at scales of 1:100 and 1:200. Preliminary results indicate that drifting snow problems are minimal at this site, except for the utility tunnel entrance to the Missile Site Radar structure. Excessive drifting occurred when the flow approached the buildings at a 45 degree angle to any of the sides. The drifts were reduced significantly when the flow was normal to any of the sides. Simulated flow directions were based on meteorological wind rose data. Field verification of the amount and extent of the drifts has not been completed. GRA

N75-29702# Germantown Labs., Inc., Philadelphia, Pa.
EXPERIMENTAL AND FLIGHT EVALUATION OF THE TITANIUM TETRACHLORIDE WATER METHANOL SYSTEM FOR THE PRODUCTION OF SMOKE TRAILS Final Report, 21 Dec. 1971 - 30 Jan. 1974
Charles S. Stokes, William J. Murphy, and Edward W. Smith 30 Jun. 1974 23 p
(Contract F19628-72-C-0174; AF Proj. 7635)
(AD-A006126; AFCRL-TR-74-0496) Avail: NTIS CSCL 04/1

A titanium tetrachloride-water system was developed and used in aircraft and rocket dispensers as a marker for the measurement of natural stratospheric motions and to measure the effects of aircraft operations in the stratospheric environment. These data will be used to predict the effects of aerospace operations in the stratosphere. GRA

N75-29703# Environmental Prediction Research Facility (Navy), Monterey, Calif.
AN INVESTIGATION OF INTERACTIONS BETWEEN DOUBLE CLOUDS USING A TWO DIMENSIONAL NUMERICAL MODEL
Wayne A. Sweet and Paul R. Lowe Jan. 1975 111 p refs
(AD-A006255; ENVPREDRSCHF-Tech-Paper-2-75) Avail: NTIS CSCL 04/2

Cloud interactions are investigated using a two-dimensional numerical model based on the Boussinesq approximation to the equation of motion. Kessler's parameterization for auto-conversion and collision-coalescence processes is used. A humidity impulse is in the form of a half-cosine function which increases the relative humidity to a peak supersaturation of 0.1%. This starts the convection through the release of latent heat. In addition, the impulse establishes a horizontal virtual temperature gradient, which provides initial convergence. Three double-cloud cases are studied along with a single-cloud control case. GRA

N75-29704# Naval Postgraduate School, Monterey, Calif.
A STATISTICAL VERIFICATION OF A TEN YEAR TIME SERIES OF COMPUTED SURFACE WIND CONDITIONS OVER THE NORTH PACIFIC AND NORTH ATLANTIC OCEANS M.S. Thesis
Sigurd Erling Larson Dec. 1974 99 p refs
(AD-A005869) Avail: NTIS CSCL 04/2

An attempt was made to evaluate the accuracy of a hind cast time series of surface wind vector components and speeds for the period of January 1960 through December 1969. The quasi-geostrophic model used to calculate these records is described as well as the twelve-hourly surface pressure data which were used as input. The central moments of the probability distributions of the computed records are compared to those of corresponding time series observed on Ocean Station Vessels. Linear correlation coefficients between observed and computed records were found to average 0.81 for the components of the wind vector and 0.65 for the wind speed. Regression relations between computed and observed records also are presented. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N75-29705 British Library Lending Div., Boston Spa (England).
TAKING CORES FROM UNCONSOLIDATED SEDIMENTS OF THE SHELF AREA USING A VIBRATION-HAMMER CORER
F. C. Kogler and K. H. Veit [1974] 15 p refs Transl. into ENGLISH from Meerestechnik (West Germany), v. 4, no. 3, 1973 p 91-95 In ENGLISH and GERMAN
(BLL-M-23679-(5828.4F)) Avail: British Library Lending Div.,

Boston Spa, Engl.: 2 BLL photocopy coupons

A corer for removing sand cores from the ocean floor is described. The corer, which operates on the vibration hammer principle, removes samples at depths of up to 300 m. Handling of the instrument is discussed along with results obtained through its use. The corer differs from other vibratory corers not only because of its method of operation, but also because sedimentary structures are only slightly disturbed over surfaces as large as 15x15 cm. Furthermore, the core compaction is only approximately 2% of the core length. Author

N75-29706*# Woods Hole Oceanographic Institution, Mass.
CATALOGUE OF GEOIDAL VARIATIONS FOR SIMPLE SEAFLOOR TOPOGRAPHIC FEATURES
Carl Bowin Feb. 1975 80 p refs
(Contract NAS6-2585)
(NASA-CR-141400; WHOI-75-14) Avail: NTIS HC $4.75 CSCL 08J

A catalogue is presented of theoretical geoidal variations for three types of structural features common to the earth's surface: seamounts, submarine ridges, and submarine trenches. These structures were simulated by simple geometric shapes modeled in three-dimensions. A computer program calculated the potential and gravitational variations over the models. Profile plots of geoidal variations and free-air gravity anomalies are presented over cross-sections of the structures. A ready reference information set is provided for comparison with satellite altimeter data for ocean areas. Author

N75-29707# Scripps Institution of Oceanography, La Jolla, Calif. Advanced Ocean Engineering Lab.
MARINE PHYSICS: INTERNAL-SURFACE WAVE INTERACTION AND MICROSTRUCTURE MEASUREMENT PROGRAM Technical Progress Report, 1 Jul. - 31 Dec. 1974
Charles S. Cox, Robherd E. Lang, Michael C. Gregg, James L. Cairns, and Gordon O. Williams 31 Dec. 1974 49 p refs
(Contract N00014-69-A-0200-6039; NR Proj. 260-105)
(AD-A005828; AOEL-68) Avail: NTIS CSCL 08/3

The semi-annual report reflects the technical status of internal/surface wave interaction and microstructure projects conducted within the Advanced Ocean Engineering Laboratory at the Scripps Institution of Oceanography. These projects are: (1) thermal Microstructure - to examine in detail the structure and dynamics of temperature and salinity and (2) atmospheric Boundary Layer - to provide an understanding of the interaction between atmospheric boundary effects and surface waves. GRA

N75-29708# Scripps Institution of Oceanography, La Jolla, Calif.
SHIP DRIFT COMPONENTS: MEANS AND STANDARD DEVIATIONS
C. K. Stidd 1 Nov. 1974 116 p refs
(Contract N00014-69-A-0200-6043)
(AD-A006470; SIO-Ref-74-33) Avail: NTIS CSCL 08/3

Nearly four million ship drift reports from 1900 through 1972 have been summarized in squares of 5 degrees latitude x 10 degrees longitude for the world's oceans and separately in 5 degrees X 5 degrees squares for the North Pacific. The components of drift are averaged in each square for each of the four seasons and for the year (grand total). Additional charts show the standard deviation of the components and the number of reports. GRA

N75-29709# Virginia Univ., Charlottesville. Dept. of Environmental Sciences.
SYSTEMATIC VARIATIONS IN INSHORE BATHYMETRY
Bruce Hayden, Wilson Felder, II, John Fisher, Donald Resio, and Linwood Vincent Jan. 1975 54 p refs
(Contract N00014-69-A-0060-0006; NR Proj. 389-158)
(AD-A006393; TR-10) Avail: NTIS CSCL 08/6

In order to investigate systematic geographic variations in subaqueous beach-zone morphology, the authors analyzed profiles taken from the shoreline to 1200 feet (365 m) offshore along the United States Atlantic and Gulf coasts for characteristic forms using an eigenvector analysis. The first three eigenfunctions derived accounted for more than 97% of the topographic variance in the profile data. The first eigenfunction represents slope departure from the mean; the second and third functions are related to variations in bar/trough morphology. Because of the orthogonality of the various eigenfunctions, the report concludes that there is no relationship between profile slope and presence or absence or number of bars on the profile. GRA

N75-29710# Rosenstiel School of Marine and Atmospheric Sciences, Miami, Fla.
HYDROSTATIC PRESSURE EQUILIBRATED TENSIOMETER
Shale Niskin Feb. 1975 6 p
(Contract N00014-67-A-0201-0013)
(AD-A006282; UM-RSMAS-75011) Avail: NTIS CSCL 13/10

A tensiometer has been developed that can measure long-term wire system performance at any depth, immune to hydrostatic pressure effects. Line tension is sensed and displayed on a Bourdon-type pressure gauge which is photographed at preselected intervals by a film-data logger mounted at the opposite end of the housing. GRA

N75-29711# Naval Ship Research and Development Center, Bethesda, Md. Ship Performance Dept.
ASR-ORTOLAN SEAKEEPING TRIALS (AS BUILD CONFIGURATION) Final Report
D. A. Woolaver and E. W. Foley Feb. 1975 59 p refs
(AD-A006249; SPD-122-18) Avail: NTIS CSCL 13/10

This report presents and discusses the results of seaworthiness trials conducted aboard the USS ORTOLAN (ASR-22) prior to the installation of a between hull forward foil. Ship motions, hull strains, and cross structure impacts are presented and comparisons are made between the ORTOLAN, the USNS HAYES (T-AGOR-16), and several monohulled ships. Current seaworthiness problems associated with the ASR Class are defined and discussed. Results indicate that while ship motions are not abnormal for a ship of this length, the frequency and intensity of cross structure impacts degrade the seaworthiness of the craft to a point which is unsatisfactory. GRA

N75-29712# Rhode Island Univ., Kingston. Dept. of Ocean Engineering.
A BIBLIOGRAPHY OF NUMERICAL MODELS FOR TIDAL RIVERS, ESTUARIES AND COASTAL WATERS
Robert Gordon and Malcolm Spaulding 1974 56 p refs
(Grant NOAA-04-3-158-3)
(COM-75-10477/8; TR-32; NOAA-75032408) Avail: NTIS HC $4.25 CSCL 08H

The document catalogs literature available in the field of numerical modeling for tidal rivers, estuaries, and coastal waters. Included models are of both a deterministic and statistical nature. The deterministic models in this classification use such forcing functions as tidal height, wind stress, density gradients, etc. in determining the velocity field. A limited number of models have been included which do not fit this description. The publication includes a document listing, a selected review and four indices: (a) keyword-in context (KWIC) index, (b) author index, (c) corporate index and (d) inverted index. GRA

N75-29713# Rosenstiel School of Marine and Atmospheric Sciences, Miami, Fla.
IMPROVED SEAGOING SCALE
Shale Niskin Feb. 1975 8 p
(Contract N00014-67-A-0201-0013)
(AD-A006321; UM-RSMAS-75007) Avail: NTIS CSCL 08/10

To solve the problems of weighing material at sea, a simple seagoing scale has been designed that accomplishes the task by eliminating platform-induced acceleration effects. The material to be weighed is placed in a sealed sample chamber with an attached air bladder; this chamber is then put into a water-filled sphere fitted with a water-displacing apparatus. By adjusting this apparatus, the volume of the air bladder is altered. Knowing the amount of water added or removed, or by determining the induced pressure, the weight of the material can be quickly and accurately ascertained. GRA

N75-29714# Rosenstiel School of Marine and Atmospheric Sciences, Miami, Fla.
SILICON-32 FIBER SAMPLER
Shale Niskin Feb. 1975 8 p
(Contract N00014-67-A-0201-0013)
(AD-A006275; UM-RSMAS-75009) Avail: NTIS CSCL 08/10

To facilitate the extraction of cosmogenic Silicon-32 from sea water, a compliant bag-type sampler has been designed that eliminates excessive wire and sampler strain by connection to the lowering wire via a long, elastic nylon rope. Filtration takes place through a funnel-like mouth held open by water force while the sampler is hauled up or down. This Silicon-32 sampler was employed serially during the GEOSECS expeditions. GRA

N75-29715# Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
CABLE STRUMMING EXPERIMENTS Final Report
N. B. Davis and S. D. Jessup Nov. 1974 29 p
(Contract N00014-67-A-0204-0084)
(AD-A005894; Rept-74-19) Avail: NTIS CSCL 13/10

Preliminary cable strumming experiments were conducted in an ocean field test. The measured average amplitudes were in the range 0.12 - 0.47 of the cable diameter and the measured values of Strouhal number were in the range 0.3 - 0.7. Tests were also conducted on cables with anti-strumming fairings. One of the fairings essentially eliminated strumming but the drag was very high. GRA

N75-29716# Naval Research Lab., Washington, D.C.
A PROGRAM TO PLOT BATHYMETRIC AND MAGNETIC ANOMALY PROFILES
Marilyn L. Blodgett and Leon LaLumiere Jan. 1975 38 p
(XF52552700)
(AD-A006253; NRL-MR-2985) Avail: NTIS CSCL 08/10

A program has been written for plotting bathymetric and magnetic anomaly profiles using a Mercator projection for scaling. This feature allows the user to overlay the profiles on a Mercator chart. Options include the scaling factor, vertical exaggeration of the profiles, and type of horizontal axis (latitude or longitude). The program was written in FORTRAN IV for use on the CDC 3800; however, the program can be converted to run on other systems with little difficulty. GRA

N75-29717# International Business and Research, Inc., Coral Gables, Fla. Aero Oceanics Div.
PROJECT STORMWATER: THE COLLECTION OF BATHYTHERMOGRAPHIC DATA AND AIRBORNE RADIATION SEA SURFACE TEMPERATURE MEASUREMENTS IN THE WAKE OF HURRICANE IRAH Final Report, 14 May - 14 Nov. 1973
Mark Goldstein 27 Aug. 1974 53 p
(Contract NOAA-03-3-022-100; NR Proj. 083-293)
(AD-A005909; RIF20233) Avail: NTIS CSCL 08/10

Sea surface temperatures collected in the wake of Hurricane Irah indicated that no cold water upwelling was observed at the surface. This absence of upwelling indicates that the effects of the speed and intensity of a storm on the thermocline depth are not clearly understood and need further study. The failure of the telemetry systems between the AXBT and the receiver in the aircraft resulted in a considerable loss of data. New developments in these systems have been made which have corrected these deficiencies. Further developments offer a wide range of depth capabilities from 1,500 ft. to 6,000 ft. Also the calibration for the new probes is quite stable eliminating the necessity for individual calibrations. GRA

N75-29666 Mainz Univ. (West Germany). Inst. fuer Meteorologie.
THE COOL SKIN OF THE OCEAN
Hartmut Grassl and Hans Hinzpeter *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 229-236 refs (For availability see N75-29639 20-47)

N75-29675 Rosenstiel School of Marine and Atmospheric Sciences, Miami, Fla.
FLUCTUATIONS IN THE VERTICAL STRUCTURE OF THE ATLANTIC EQUATORIAL UNDERCURRENT
Z. R. Hallock and K. V. Moroshkin (Acad. of Sci. (USSR), Kaliningrad) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 324-327 (For availability see N75-29639 20-47)

N75-29676 Articheskii i Antarkticheskii Nauchno- Issledovatelskii Institut, Leningrad (USSR).
ON THE REALITY OF EXISTENCE OF SPORADIC LARGE-SCALE EDDY FORMATIONS IN THE OCEAN
N. I. Tyabin and B. A. Sleptsov-Shevlevich *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 328-343 (For availability see N75-29639 20-47)

N75-29677 National Oceanic and Atmospheric Administration, Boulder, Colo.
OCEAN CURRENTS OBSERVED BY NOAA SHIP OCEANOGRAPHER DURING GATE
Richard E. Newell *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 344-355 (For availability see N75-29639 20-47)

N75-29678 Articheskii i Antarkticheskii Nauchno- Issledovatelskii Institut, Leningrad (USSR).
MAIN STATISTICAL CHARACTERISTICS OF CURRENTS IN THE NORTHERN PART OF B-SCALE
O. A. Vladimirov, I. D. Zikov, and I. N. Koltakov *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 356-362 refs (For availability see N75-29639 20-47)

N75-29679 Articheskii i Antarkticheskii Nauchno- Issledovatelskii Institut, Leningrad (USSR). Oceanographic Inst.
ON REPRESENTATIVITY OF WAVE MEASUREMENTS MADE BY SOVIET SHIPS DURING TROPICAL EXPERIMENT-74
I. N. Davidan, U. V. Oljunin, and U. A. Trapeznikov *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 363-367 refs (For availability see N75-29639 20-47)

N75-29680 Oregon State Univ., Corvallis. Dept. of Oceanography.
ANOMALOUS VARIATIONS IN TEMPERATURE-SALINITY RELATIONSHIPS AT GATE STATION 7
C. Koblinsky and P. L. Grose (Natl. Oceanic and Atmospheric Admin., Washington, D. C.) *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 368-371 (For availability see N75-29639 20-47)

N75-29681 Kiel Univ. (West Germany). Inst. fuer Meereskunde.
VARIATIONS OF TEMPERATURE, SALINITY AND CURRENTS IN THE MIXED LAYER AND THE THERMOCLINE (PRELIMINARY RESULTS)
G. Siedler and W. Zenk *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 372-378 (For availability see N75-29639 20-47)

N75-29682 Hydrometeorological Scientific Research Center (USSR).
ON SOME QUESTIONS OF INTERACTION BETWEEN THE OCEAN AND ATMOSPHERE IN THE NORTHERN PART OF A/B SCALE
V. S. Krasjuk *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 379-386 ref (For availability see N75-29639 20-47)

N75-29683 Academy of Sciences (USSR), Moscow.
THE EXPERIMENT OF INVESTIGATION OF THE DYNAMICS OF THE UPPER OCEAN LAYER AT THE EQUATOR
V. D. Egorikhin, V. M. Radikevich, and V. N. Kudryavtsev *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 387-391 refs (For availability see N75-29639 20-47)

N75-29684 National Oceanic and Atmospheric Administration, Miami, Fla. (Atlantic Oceanographic and Meteorological Labs.
PRELIMINARY ANALYSIS OF OCEAN INTERNAL WAVE OBSERVATIONS BY ACOUSTIC SOUNDINGS
Feodor Ostapoff, John Proni, and Ron Sellers *In* WMO Prelim. Sci. Results of the GARP Atlantic Trop. Expt., Vol. 2 Jan. 1975 p 392-397 refs (For availability see N75-29639 20-47)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N75-29718*# Kanner (Leo) Associates, Redwood City, Calif.
CHEMICAL CONTROLS FOR STERILIZATION IN AUTOCLAVES
Astrid O. Rex and Hugo V. Zunino Washington NASA Jul. 1975 11 p refs Transl. into ENGLISH from Rev. Med. Chile (Chile), 1972 p 1087-1090
(NASA-TT-F-16478) Avail: NTIS HC $3.25 CSCL 06M

The relative resistance to heat applied in an autoclave of three bacteria: Bacillus subtilis, Staphylococcus aureus and Salmonella senftenberg, was studied. The viability of these bacteria following exposure to moist heat at different levels of heat and exposure time was studied in conjunction with the change in color of several types of chemical sterilization controls under the same conditions. The conclusions regarding the ratio of complete bacteria destruction to change in the chemical controls are the following: (1) there was a definite correlation between bacteria survival and change in the chemical controls; (2) there was a wide margin between chemical control change and survival of some bacteria; (3) there was evident survival where a very light brown color occurred; but none of the bacteria studied survived when the controls attained a dark brown color. Author

N75-29719*# Kanner (Leo) Associates, Redwood City, Calif.
CHEMICAL CONTROLS FOR DRY HEAT STERILIZATION
Astrid O. Rex and Hugo V. Zunino Washington NASA Jul. 1975 8 p refs Transl. into ENGLISH from Rev. Med. Chile (Chile), v. 102, no. 1, 1974 p 26-28
(NASA-TT-F-16321) Avail: NTIS HC $3.25 CSCL 06M

The correlation of the minimum requirements for change in color of various chemical dry heat sterilization controls and the minimum conditions for actual sterilization was studied. The resistance of three microbial species (B. subtilis, S. senftenberg and S. aureus) to dry heat was tested and compared with the changes produced in domestic and imported chemical controls. The effect of temperatures ranging from 130 C to 180 C for periods ranging from 30 to 90 minutes was studied. The resistance of B. subtilis was much greater than that of the other species and some survival was observed at 160 C for 1 hour. Complete color change occurred following exposure to 160 C for 1 hour or more, so that the margin of safety of the chemical dry heat sterilization controls is relatively limited. Author

N75-29720*# Scientific Translation Service, Santa Barbara, Calif.
SPACE FOOD PREPARATION AND PACKAGING. A MENU FOR COSMONAUTS AND 'SPACE' BREAD
A. Perkunov Washington NASA Jul. 1975 7 p Transl. into ENGLISH from Russian Newspapers 1974
(Contract NASw-2483)
(NASA-TT-F-16467) Avail: NTIS HC $3.25 CSCL 06H

Food preparation for space was described in conjunction with the Soyuz 14 - Salyut 3 flights. Two foods developed - a tomato sauce Moldava and fruit bars - were taken on the current flight and apparently enjoyed by the cosmonauts. The sauce was packaged in aluminum tubes with special clips for attachment; the bars were infrared dried, pressed, and packaged in plastic. A discussion of space food preparation is included that describes bread and cottage cheese packaged in a digestable plastic wrap. Author

N75-29721*# Kanner (Leo) Associates, Redwood City, Calif.
CERTAIN CHARACTERISTIC FEATURES OF FLOWERING AND POLLINATION IN DUCKWEEDS (LEMNACEAE S. GRAY)
I. E. Ivanova Washington NASA Aug. 1975 21 p refs Transl. into ENGLISH from Botan. Zh. (Leningrad), v. 55, May 1970 p 649-659
(Contract NASw-2790)
(NASA-TT-F-16483) Avail: NTIS HC $3.25 CSCL 06F

The species of the Lemnaceae subfamily differ from those of Wolffioideae by the presence of the spathe. The membranous spathe of duckweeds is the phyllocladium reduced in size with reproductive organs on the dorsal surface (as in Wolffioideae). The data on the chemical analyses of water under flowering specimens are important for the ecology of flowering duckweeds. Duckweeds are capable of pollination by insects, by wind and also of self-pollinating in cases of failure in cross pollination. Author

N75-29722# Advisory Group for Aerospace Research and Development, Paris (France).
CURRENT STATUS IN AEROSPACE MEDICINE
Walton L. Jones, ed. (NASA, Washington) May 1975 75 p refs Presented at the Aerospace Med. Panel Meeting, Naples, 16-20 Sep. 1974
(AGARD-CP-154) Avail: NTIS

Papers are presented which discuss the following topics: habitability factors in the design of future space systems, ejection problems, and health and career management issues in the military services. For individual titles, see N75-29723 through N75-29729.

N75-29723 United Aircraft Corp., Washington, D.C. Hamilton Standard Div.
SPACE LIFE SUPPORT TECHNOLOGY FOR A MODULAR INTEGRATED UTILITY SYSTEM c54
Edwin J. Wulff *In* AGARD Current Status in Aerospace Med. May 1975 8 p refs (For availability see N75-29722 20-51)

Space station environmental control systems developed to provide water purification, waste disposal, heating, cooling, contaminant control, and power generation are considered for commercial application. An earth oriented program, Modular Integrated Utility System (MIUS), designed to recycle energy through the integration of utility services in a single plant that provides solid and liquid waste treatment, water purification, domestic hot water, air conditioning and space heating, and electricity is described. The modularity of the MIUS concept is adaptable to military and disaster-relief applications and makes possible the desired technology transfer from the space program to the utility needs of the less developed nations. Author

N75-29724 European Space Technology Center, Noordwijk (Netherlands).
HABITABILITY DESIGN IN EUROPE'S SPACELAB: A STATUS REPORT c54
A. B. Thompson *In* AGARD Current Status in Aerospace Med. May 1975 7 p refs (For availability see N75-29722 20-51)

The habitability data obtained on previous manned space missions, particularly Skylab are reviewed in terms of the Spacelab module design, both interior environment and laboratory architecture. Unresolved habitability problems concerning the lack of up-to-date anthropometric data on males and females and potential motion sickness during the first days of weightlessness are considered. J.M.S.

N75-29725* National Aeronautics and Space Administration, Washington, D.C.
A SUMMARY OF SKYLAB FINDINGS OF INTEREST TO LIFE SCIENTISTS c54
Walton L. Jones *In* AGARD Current Status in Aerospace Med. May 1975 16 p refs (For availability see N75-29722 20-51)

The medical findings of the Skylab mission are discussed along with the habitability, man machine factors, and the reliability of Skylab life support systems. Author

N75-29726 Italian Air Force Aerospace Medical Center, Rome.
PRELIMINARY RESEARCH ON BODY DISPLACEMENT DURING LUNAR WALKING c52
A. Scano and A. Castellani *In* AGARD Current Status in Aerospace Med. May 1975 6 p refs (For availability see N75-29722 20-51)

A 16 mm film taken during Scott's and Irwin's walk on the surface of the moon is employed to analyze body displacement during lunar walking. The technique and results are described. J.M.S.

N75-29727 School of Aerospace Medicine, Brooks AFB, Tex. Biodynamics Branch.
THE PLUS Gz PROTECTIVE METHODS FOR USE IN ADVANCED FIGHTER-ATTACK AIRCRAFT c54
Robert W. Krutz, Jr., Sidney D. Leverett, Jr., Russell R. Burton, and John W. Burns *In* AGARD Current Status in Aerospace

Med. May 1975 7 p refs (For availability see N75-29722 20-51)

Methods to enhance acceleration tolerance and protection are reviewed. Emphasis is placed on the following anti-G devices or techniques: (1) the L-1 straining maneuver, (2) positive pressure breathing, (3) preacceleration inflation, (4) uniform pressurization of the lower body, and (5) a tilt-back seat. J.M.S.

N75-29728 School of Aerospace Medicine, Brooks AFB, Tex. Clinical Sciences Div.

THE AIRCREWMAN AT INCREASED RISK OF ISCHEMIC VASCULAR DISEASE **c52**

Malcolm C. Lancaster *In* AGARD Current Status in Aerospace Med. May 1975 5 p refs (For availability see N75-29722 20-51)

A combined risk approach is proposed to delay or prevent the serious consequences of ischemic vascular disease (IVD). The approach consists of a set of risk factors that predict individual susceptibility to IVD and a set of proven interventions directed at specific risk factors. J.M.S.

N75-29729 Defense Dept., Washington, D.C. Office of the Assistant Secretary of Defense for Health and Environment.

A STUDY ON MEDICAL OFFICER CAREER MANAGEMENT AND RETENTION IN THE USA ARMED FORCES **c52**

John E. Murphy *In* AGARD Current Status in Aerospace Med. May 1975 13 p refs (For availability see N75-29722 20-51)

Factors which influence career management and retention of medical officers in the Armed Forces are identified. Various mathematical techniques were used to identify the individual goals of medical officers and the relationship of these goals to selected aspects of a military career. Results include information on the perceptions and expectations of young medical officers toward a career in the Armed Forces. Specific potential policy changes are evaluated in terms of improved career management and increased retention of medical officer. Author

N75-29730# Auburn Univ., Ala. Cooperative Wildlife Research Unit.

THE EFFECT OF SONIC BOOM ON THE NESTING AND BROOD REARING BEHAVIOR OF THE EASTERN WILD TURKEY Final Report

Thomas E. Lynch and Dan W. Speake Jan. 1975 39 p refs (Contract DOT-FA72WAI-238)

(AD-A005986; ARD-550; FAA-RD-75-2) Avail: NTIS HC $11.50 CSCL 06/3

Twenty wild turkey hens were captured and equipped with 164 MHz transmitters. The nest sites of eight hens were successfully located by telemetric triangulation and four of these were subjected to both real and simulated sonic booms. Hens with young were also located but were subjected to simulated sonic booms only. Results indicate that sonic booms do not initiate any abnormal behavior in wild turkeys or decrease their productivity. Author

N75-29731*# Transemantics, Inc., Washington, D.C.

EFFECT OF SECTIONING OF THE SPINAL CORD IN THE MIDLUMBAR PORTION ON HEAT EXCHANGE AND DEVELOPMENT OF FEVER IN RABBITS

A. I. Anisimov Washington NASA Aug. 1974 7 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), v. 13, Jan.-Feb. 1969 p 76-78

(Contract NASw-2792)

(NASA-TT-F-16496) Avail: NTIS HC $3.25 CSCL 06C

Shifts in total heat exchange following a spinal section are discussed which permit the retention of homiothermy, the role of parts of the body with impaired and preserved innervation, and the degree of participation of physical and chemical heat regulation in the development of fever under these conditions. The experiments were conducted on 12 male rabbits and the spinal section was performed at the L2-L4 level. It was found that the heat loss and the production of heat in the body increased. The increase in heat emission from parts deprived of normal innervation was offset by an increase in thermogenesis and a decrease in the heat emission from ear skin. Fever in the test rabbits did not differ appreciably from that of normal ones. Author

N75-29732*# Transemantics, Inc., Washington, D.C.

RESISTANCE OF NADSONIELLA NIGRA VAR. HESUELICA TO THE ACTION OF A HIGH VACUUM

A. A. Imshenetskiy, S. V. Lysenko, S. P. Lyakh, and V. F. Udovenko Washington NASA Aug. 1975 7 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (USSR), Jan. - Feb. 1974 p 125-127

(Contract NASw-2792)

(NASA-TT-F-16503) Avail: NTIS HC $3.25 CSCL 06M

Data are given on the resistance of Nadsoniella nigra var. hesuelica to a high vacuum (10 to the minus 9th power Torr) at low temperatures. The oxidative function and activity of iron porphyrin proteins are studied in the surviving cells. A high resistance of this culture to a high vacuum is demonstrated, this being consistent with its low sensitivity to the action of several other factors. Author

N75-29733# Rutgers Univ., New Brunswick, N.J.

BIODEGRADATION OF SOME POLYNUCLEAR AROMATIC PETROLEUM COMPONENTS BY MARINE BACTERIA Technical Report, 1 Jan. - 31 Dec. 1974

D. Dean-Raymond and R. Bartha 25 Feb. 1975 21 p refs (Contract N00014-67-A-0115-0005; NR Proj. 137-843)

(AD-A006346; TR-N-5) Avail: NTIS CSCL 06/13

The metabolism of polynuclear aromatic hydrocarbons was studied using gas chromatographic, thin-layer chromatographic, infrared and mass spectrometric techniques. Of six bacterial strains isolated from oil polluted estuarine water, all grew on naphthalene, 2-methylnaphthalene and 2-ethylnaphthalene as sole sources of carbon and energy. Several other alkyl naphthalenes were metabolized by various strains. Phenanthrene and anthracene were metabolized by three out of six organisms. Only one naphthalene-grown strain was able to metabolize other polyaromatic compounds, including acenaphthylene, biphenyl, fluorene and tetralin. The specificity of salicylate hydroxylase governs the utilization of several naphthalene derivatives while inability to oxidize naphthoic acids prevents growth on dimethylnaphthalenes. GRA

N75-29734# Rosenstiel School of Marine and Atmospheric Sciences, Miami, Fla.

IN-SITU SEPARATOR

Shale Niskin Feb. 1975 12 p refs

(Contract N00014-67-A-0201-0013)

(AD-A006274; UM-RSMAS-7) Avail: NTIS CSCL 06/2

The device was developed to study the primary productivity of small organisms. The sampler is messenger actuated in two discrete steps. The first step actuates the sampler, filling its chamber with water and injecting the tracer solution. The sample is then allowed to incubate. The second messenger actuation causes a discharge of compressed gas to enter the chamber via a manifold arrangement, forcing the contained water out through a millipore filter. Both entry and exit of water are controlled by a dual-valve arrangement. The sampler is recovered empty of its contents with the millipore filter ready for laboratory analysis. GRA

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N75-29735*+ National Aeronautics and Space Administration, Washington, D.C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 142

Jun. 1975 78 p refs

(NASA-SP-7011(142)) Avail: NTIS HC $4.00 CSCL 06E

This bibliography lists 256 reports, articles, and other documents introduced into the NASA scientific and technical information system in May 1975 for aerospace medicine and biology. Author

N75-29736# Advisory Group for Aerospace Research and Development, Paris (France).

TREADMILL EXERCISE TESTING AT THE USAF SCHOOL

OF AEROSPACE MEDICINE: PHYSIOLOGICAL RESPONSES IN AIRCREWMEN AND THE DETECTION OF LATENT CORONARY ARTERY DISEASE
V. F. Froelicher (School of Aerospace Med.), F. Yanowitz (School of Aerospace Med.), A. J. Thompson (School of Aerospace Med.), and M. C. Lancaster (School of Aerospace Med.) May 1975 65 p refs
(AGARD-AG-210; AGARDograph-210) Avail: NTIS HC $4.25

Despite the selective nature of the USAF flying population, coronary heart disease is the leading disease cause of death, disability and removal from flying duties. The purpose is to present the experience of the United States Air Force School of Aerospace Medicine (USAFSAM) in the use of treadmill exercise for evaluating asymptomatic aircrewmen. The monograph consists of separate studies involving aspects of treadmill testing experience at the USAFSAM including descriptions of techniques. For individual titles, see N75-29737 through N75-29738.

N75-29737 Advisory Group for Aerospace Research and Development, Paris (France).
PHYSIOLOGICAL PARAMETERS OF EXERCISE PERFORMANCE
In its Treadmill Exercise Testing at the USAF School of Aerospace Med. May 1975 p 1-14 (For availability see N75-29736 20-52)

When technology became available to collect and analyze expired air, the measurement of maximal oxygen consumption (VO2 max) was considered advantageous in evaluating functional capacity. Tests were specifically designed to measure this physiological parameter. Maximal aerobic working capacity is defined as the work level at which oxygen consumed fails to increase linearly with further increases in workload and the oxygen consumption at this point is called VO2 max. A study was designed to compare VO2 max and other physiological parameters measured during three standard protocols and to evaluate the reproducibility of each. Author

N75-29738 Advisory Group for Aerospace Research and Development, Paris (France).
ELECTROCARDIOGRAPHIC ASPECTS OF EXERCISE TESTING
In its Treadmill Exercise Testing at the USAF School of Aerospace Med. May 1975 p 14-60 refs (For availability see N75-29736 20-52)

With additional experience and reevaluation of the original criteria, emphasis was placed on the importance of ST segment depression as the primary sign of myocardial ischemia. A table summarizes the studies screening asymptomatic men using the double Master's test or a test with a comparable workload. These studies included follow-up data and it is apparent that postexercise ST segment depression identified a high risk group of men. The epidemiological terms used to describe the performance of screening tests are defined. Author

N75-29739*# Scientific Translation Service, Santa Barbara, Calif.
THE PROPHYLACTIC EFFECT OF HEADCOOLING ON COAL MINER'S CRAMPS. 1: ELECTROENCEPHALOGRAPHIC OBSERVATION ON RABBITS DURING HEAD-COOLING UNDER THE HOT AND HUMID ENVIRONMENT
Tsuneo Shiratori, Kazuo Sasaki, Kyoji Sugawara, Takashi Iwamatsu, and Shun Kuroda Washington NASA Jul. 1975 19 p refs Transl. into ENGLISH from Tohoku Ishi, (Japan), v. 66, no. 1, 1963 p 258-265
(Contract NASw-2483)
(NASA-TT-F-16448) Avail: NTIS HC $3.25 CSCL 06P

An attempt was made in rabbit experiments to determine the effect of cooling the heads of subjects exposed to hot humid conditions, such as exist in Japanese mines. Electroencephalograms confirmed the positive effect of head cooling using water and ice packs. Author

N75-29740*# Texas Univ., Houston.
STUDY TO DEFINE AND VERIFY THE PERSONAL ORAL HYGIENE REQUIREMENTS FOR EXTENDED MANNED SPACE FLIGHT: ORAL PHYSIOLOGY AND MICROBIOLOGY IN SKYLAB MANNED SPACE MISSIONS Annual Report, 1 Jul. 1974 - 30 Jun. 1975
Lee R. Brown 30 Jun. 1975 12 p
(Contract NAS9-11118)
(NASA-CR-144361) Avail: NTIS HC $3.25 CSCL 06I

Methods for metabolic fingerprinting of pathogenic oral bacteria were developed and the effects of skylab missions on salivary electrolyte levels were studied. High resolution gas liquid chromatographic (GLC) and pyrolysis-GLC procedures were used to obtain metabolic profiles of closely related bacteria associated with dental caries and periodontal disease. It was found that the GLC procedures provide a practical and reproducible means of obtaining metabolic markers for identifying closely related strains of these organisms. Fractions of stimulated whole saliva samples from the prime and back-up crews of the three Skylab missions were used to measure salivary electrolyte concentrations. All the electrolytes previously reported as having increased in urine and feces during the missions were assessed. Sodium, potassium, calcium, magnesium, phosphorous and chloride were studied. A decrease in sodium and an increase in magnesium were observed, but the mineral imbalances attributable to the mission-related increases in urinary electrolytes were not detected. Author

N75-29741*# Scientific Translation Service, Santa Barbara, Calif.
ON THE OTOLITHS AND THEIR ORIGIN
S. Nishio Washington NASA Aug. 1975 68 p refs Transl. into ENGLISH from Arch. Ohren, Nasen- Kehlkopfheilk. (West Germany), v. 115, 1926 p 19-63
(Contract NASw-2483)
(NASA-TT-F-16470) Avail: NTIS HC $4.25 CSCL 06P

The otoliths of the vertebrates have been known for a relatively long time. They were, naturally, first discovered in the teleosts, where they are the largest, most compact, and relatively enduring. They may well have been known for as long as sentient men have been observant in cutting up fish skulls. But their relation with the labyrinth was first detected in 1789 by Scarpa, who called them ear bones. Only later were they detected in birds by Breschet, and in humans and mammals. Author

N75-29742*# Scientific Translation Service, Santa Barbara, Calif.
STUDIES ON THE OTOLITHS OF THE TELEOSTS
Cl. Fritz Werner Washington NASA Aug. 1975 126 p refs Transl. into ENGLISH from Z. Wiss. Zoo. (East Germany), v. 131, 1928 p 502-587
(Contract NASw-2483)
(NASA-TT-F-16471) Avail: NTIS HC $5.75 CSCL 06P

The function, shapes, and purpose of the otolith in fishes were investigated in numerous species. Differences in the macula, marginal epithelia, marginal fibrosities, and otolith parts are very pronounced among species. New hypotheses about the purpose of the otolith in fishes are presented. The dynamics of the components is investigated. Author

N75-29743*# Pennsylvania State Univ., University Park.
EFFECTS OF HYPNOTIC DRUGS ON PERFORMANCE BEFORE AND AFTER SLEEP Final Technical Report, 1 Jun. 1971 - 28 Feb. 1975
A. Kales, E. O. Bixler, and J. D. Kales [1975] 46 p refs
(Grant NGR-39-009-204)
(NASA-CR-143311) Avail: NTIS HC $3.75 CSCL 06O

The effects of various hypnotics on sleep stage parameters and on the parameters of effectiveness were evaluated along with the effects of several commonly used yet distinctly different hypnotics on daytime performance. The effects on daytime performance of two nonhypnotics commonly used in the space program were also examined. Author

N75-29744# Chemical Lab. RVO-TNO, Rijswikj (Netherlands).
A STRUCTURE ACTIVITY STUDY OF OXIMES AIMING AT PROPHYLAXIS AGAINST ORGANOPHOSPHATES
H. P. Benschop, L. P. A. DeJong, H. Kienhuis, ed., J. A. J. Vink, F. Berends, ed., D. M. W. Elskamp, L. A. Kepner, E. Meeter, and R. P. L. S. Visser 1974 28 p refs Prepared jointly with Med. Biol. Lab. RVO-TNO
(CL-1974-23; MBL-1974-37; TDCK-65733) Avail: NTIS HC $3.75

Development of oximes and other anticholinesterases of high toxicity is investigated. These oximes should be potent reactivators, have low toxicity and be excited and transformed slowly by the body. Properties of synthesized oximes evaluated are: reactivating potency in vitro, toxicity in mice, biological half

life in the blood of rats and rabbits after intravenous injection, and prophylactic activity against Sarin in mice. Penetration into the central nervous system of a number of the oximes was investigated using rats. ESRO

N75-29745# National Physical Lab., Teddington (England). Div. of Computer Science.
SOME PRELIMINARY EXPERIMENTS IN THE USE OF A PROGRAMMABLE VIDEOTAPE RECORDER AS AN AUTOMATED HISTORY-TAKING DEVICE IN A CHEST CLINIC
C. R. Evans, C. G. J. Kinchin (Guys Hosp. Med. School), H. C. Price (Western Hosp., London), and P. B. Whittle Mar. 1974 14 p refs
(NPL-Com-73) Avail: NTIS HC $3.25

The videotape recorder (VTR) was used as a doctor simulator to register the answers to diagnosing questions of cardio-pulmonary diseases patients. The system consists of a control panel with yes, no, repeat, and ? buttons operated by the patient; a logic box to control the VTR; an ICT VR 321; and a video monitor. The experimental procedure is described, the interviews held after each of the 20 man machine diagnoses are summarized, and preliminary conclusions are drawn. ESRO

N75-29746# School of Aerospace Medicine, Brooks AFB, Tex.
EVALUATION OF AN ACOUSTICAL X-Y DIGITIZER FOR USE IN BIOMEDICAL DATA REDUCTION TASKS Final Report, Nov. 1973 - Jun. 1974
Darwell E. Stowe, Robert A. Balusek, and Douglas H. Threatt Dec. 1974 11 p refs
(AF Proj. 6319)
(AD-A005293; SAM-TR-74-63) Avail: NTIS CSCL 06/2

Air Force biomedical data are often obtained in hard copy, graphic, or pictorial form. Manual data reduction is laborious and time consuming. The work reported here was directed at the development of methods for utilizing a new principle (acoustic ranging) for retrieving (digitizing) X-Y coordinate values from strip charts, graphs, X-ray photographs, or drawings. Included are the results of a statistical study designed to assess the resolution, precision, bias, and linearity of the system. These results verify that the quality of this digitizing process is more than adequate for use on most biomedical applications encountered at the school. GRA

N75-29747# Michigan Univ., Ann Arbor. Highway Safety Research Inst.
BASIC BIOMECHANICAL PROPERTIES OF THE HUMAN NECK RELATED TO LATERAL HYPERFLEXION INJURY Final Report, 1 Nov. 1973 - 31 Dec. 1974
Richard G. Snyder, Don B. Chaffin, Lawrence W. Schneider, David R. Foust, Bruce M. Bowman, Thomas A. Abelnour, and Janet K. Baum 15 Apr. 1975 311 p refs
(Contract DRDA-74-342-B1)
(PB-241246/8; UM-HSRI-BI-75-4) Avail: NTIS HC $9.25 CSCL 06S

Properties of the human neck which may influence a person's susceptibility to whiplash injury during lateral impact have been studied in 96 normal subjects. The data include: measures of head, neck and body anthropometry in standing and normal seated positions; stretch reflex time of sternomastoid muscles; head/neck response to low-level acceleration, voluntary isometric muscle force in the lateral direction; and three dimensional range of motion of the head and neck. Data are presented in a format applicable for biomechanical modeling of the seated human occupant and have been used in the MVMA-2D model adjusted for side impact at 10 and 30 mph to determine the influence of the measured properties of reducing whiplash injury susceptibility. GRA

N75-29748# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
THE EFFECT OF QUIET ON HEARING
Charles W. Nixon and Mark R. Stephenson Jan. 1975 22 p (AF Proj. 7231)
(AD-A006395; AMRL-TR-74-99) Avail: NTIS CSCL 05/10

The hearing of subjects participating in psychoacoustic experiments may be elevated (temporary hearing loss) due to environmental noises encountered prior to their arrival at the test site. Hearing threshold levels of trained subjects were measured immediately upon arrival at the Laboratory and again following individual 1/2, 1, and 2 hour periods in the quiet of an anechoic chamber. Comparisons of prequiet and postquiet thresholds revealed a slight trend of 1 or 2 decibles toward improved hearing after quiet. However, the changes in hearing thresholds were not statistically significant and were judged to be too small to be of practical significance. GRA

N75-29749# Army Aeromedical Research Lab., Fort Rucker, Ala.
EVALUATION OF PROPOSED ELECTROPLATED HGU-4-/P FRAMES Final Report
Roger W. Wiley, Frank S. Pettyjohn, and David D Glick Feb. 1975 15 p refs
(AD-A006121; USAARL-75-9) Avail: NTIS CSCL 06/5

A gold electroplated frame has been recommended to replace the standard gold-filled aviator frame. Since the proposed frame contains a nickel-silver based metal, the frame was evaluated under field and laboratory conditions at the U.S. Army Aeromedical Research Laboratory. Of the 18 subjects who wore the test frames for three months, one subject, an aviator, developed a mild dermatitis along the frontal and supraorbital portion of the face. Chemical analysis indicated free nickel in sufficient quantity to cause a reaction from nickel sensitive individuals. This study has shown that some skin reaction can be expected from a small percentage of wearers if the gold electroplated frame replaces the gold-filled frame. GRA

N75-29750# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A SIMULATION OF THE EMERGENCY CLINIC AND DEPARTMENT OF PRIMARY CARE AT THE WRIGHT-PATTERSON AFB MEDICAL CENTER M.S. Thesis
Theodore L. Brown and Donald R. Dyer Jan. 1975 191 p refs
(AD-A006345; SLSR-17-75A) Avail: NTIS CSCL 06/12

The thesis concerns the development of a computer simulation model of the Emergency Clinic and Department of Primary Care of the Wright-Patterson AFB Medical Center in search of a way to reduce patient waiting time. The authors determined that by revising medical personnel work schedules and by implementing a telephone scheduling system for patients, waiting time could be reduced considerably. GRA

N75-29751# Lovelace Foundation for Medical Education and Research, Albuquerque, N.Mex.
EFFECTS OF 60 Co ON ELECTRICAL SELF-STIMULATION OF THE BRAIN AND BLOOD PRESSURE
Alfred Bruner 13 Dec. 1974 27 p refs
(Contracts DASA01-70-C-0059; DNA001-74-C-0098; DNA Proj. NWED-QAXM)
(AD-A006428; DNA-3463T) Avail: NTIS CSCL 06/18

The effects of 1000 and 2000 rad Co60 on electrical self-stimulation of subcortical brain areas and blood pressure were investigated to determine whether radiation-induced performance decrement occurs in a like manner for a positively-rewarded behavioral task as it does for the more typically studied shock-avoidance task. During the early postradiation minutes, self-stimulation responses decreased or ceased and resumed shortly thereafter, revealing a similar course of performance decrement as seen with shock-avoidance, discrimination tasks. Early postradiation hypotension with subsequent recovery parallel the performance decrement, reproducing the blood pressure-behavior correlations seen previously with shock reinforcement. The blood pressure elevating influence of the brain stimulation observed prior to irradiation was diminished or absent during the deep hypotensive stage postradiation, but tended to return minutes later. Author (GRA)

N75-29752# Payne, Inc., Annapolis, Md.
SOME STUDIES RELATING TO LIMB FLAILING AFTER AN EMERGENCY ESCAPE FROM AN AIRCRAFT Final Report, 30 Jun. 1971 - 2 Mar. 1973
P. R. Payne Dec. 1974 146 p refs
(Contract F33615-71-C-1892; AF Proj. 7231)
(AD-A005699; Working-Paper-101-16; AMRL-TR-73-24) Avail: NTIS CSCL 06/19

When a crew member ejects in an open escape seat, his limbs may become dislodged from the seat and forced to trail behind him. Injury may result. The study described in this report is concerned with discovering the basic mechanisms of flail injury, and determining the loads which cause limb dislodgement. Simple dynamic concepts and models are presented together with the results of wind tunnel measurements of body segment forces. Tunnel tests were limited to the symmetrical case of zero pitch and yaw. Wind tunnel measurements were also made of body segment forces in simulated Tractor Rocket Egress System body positions. In all cases, live human subjects were used. It is believed that flail injury can be prevented, and several solutions are suggested. GRA

N75-29753# Southwest Research Inst., San Antonio, Tex.
RESEARCH ON BIOLOGICAL EFFECTS OF VLF BAND ELECTROMAGNETIC RADIATION Final Report, Jun. 1973 - Apr. 1974
James N. Bollinger, Rammon L. Lawson, and Walter C. Dolle Nov. 1974 139 p
(Contract F41609-73-C-0035; AF Proj. 7757)
(AD-A006388; SAM-TR-74-52) Avail: NTIS CSCL 06/18

Mice exposure to very high field intensities of very low frequency electromagnetic radiation was studied for nonthermal deterimental biological effects. Two field intensities were employed at a frequency of 25 kHz: E = 15,000 V/m and H = 7.5 A/m for full power exposure, and E = 10,600 V/m, H = 5.3 A/m for one-half-power exposure. Exposure consisted of 1 hr per day, 5 days a week, for a total of 50 hr the growth, reproduction, and metabolism studies. An additional group of animals was exposed 10.100 hr for assessment of possible pathological changes associated with these fields. The results indicated that the high intensity low frequency electromagnetic radiation exposure of dams and neonates had no statistical detectable effect on the growth, reproductive ability, and metabolism of the neonates or the growth of their subsequent offspring. Author

N75-29754# School of Aerospace Medicine, Brooks AFB, Tex.
LITTER ENPLANING-DEPLANING DEVICE Final Report, Jul. - Oct. 1974
Achille A. Gousie Jan. 1975 6 p
(AF Proj. 7996)
(AD-A006137; SAM-TR-75-1) Avail: NTIS CSCL 06/12

The litter enplaning-deplaning device was designed to provide a safe means for enplaning-deplaning litter patients on multimission aircraft without removing other patients in the same litter tier. Two prototypes were fabricated in-house. One prototype proved impractical for use and was abandoned. Upon successful completion of development test and evaluation of the second prototype, more units were fabricated in-house and made available to Military Airlift Command for operational test and evaluation. GRA

N75-29755# School of Aerospace Medicine, Brooks AFB, Tex.
MEASURED EFFECTS OF SQUARE WAVE MODULATED RF FIELDS (450 AND 3100 MHz) ON CARDIAC PACEMAKERS Final Report, Jan. - Jun. 1974
William D. Hurt, John C. Mitchell, and Terry O. Steiner Dec. 1974 37 p refs
(AF Proj. 7757)
(AD-A006389; SAM-TR-74-51) Avail: NTIS CSCL 06/12

Tests were performed to measure the effect of pulsed 450 and 3100 MHz RF radiation on cardiac pacemakers. All models were tested in both a free-field and a simulated-implant configuration and were continuously monitored during testing. Most of the models exhibited some type of electromagnetic interference under some conditions of the tests, although five recent, different models were unaffected under all conditions of these tests. GRA

N75-29756# Naval Aerospace Medical Research Lab., Pensacola, Fla.
THE EFFECT OF EXTREMELY LOW FREQUENCY RADIATION ON HUMAN PERFORMANCE: A PRELIMINARY STUDY Medical Research Progress Report
Richard S. Gibson and William F. Moroney Aug. 1974 24 p refs
(MF51524015)
(AD-A005898; NAMRL-1195) Avail: NTIS CSCL 06/18

Interest in the development of an extremely low frequency (ELF) communications system for naval use has resulted in a program to determine the effects of such fields on man. This report represents part of pilot level effort to develop a set of tests and procedures for determining whether ELF fields have any measureable effects on human memory and psychomotor functions. None of the tests exhibited significant performance decrements under the gross analytical conditions. The Wilkinson Adding Task exhibited significant performance decrements during the second of two testing sessions while being exposed to the ELF radiation. One of the Response Analysis Tester (RATER) conditions exhibited a significant improvement in performance. One subject had a significantly bad session in which his performance declined on 6 out 7 measures; however, this performance appeared to be unrelated to other psychological or physiological data. In view of the large number of statistical analyses performed on a limited amount of data, the few significant performance decrements must be interpreted with extreme caution. They identify techniques to be replicated in future research and nothing more. Individual differences in test performance were large, any effects due to the exposure to ELF magnetic fields were small; consequently, special consideration should be given to the possibility of using an exposure-reexposure experimental design in any future experiments. GRA

N75-29726 Italian Air Force Aerospace Medical Center, Rome.
PRELIMINARY RESEARCH ON BODY DISPLACEMENT DURING LUNAR WALKING
A. Scano and A. Castellani *In* AGARD Current Status in Aerospace Med. May 1975 6 p refs (For availability see N75-29722 20-51)

N75-29728 School of Aerospace Medicine, Brooks AFB, Tex. Clinical Sciences Div.
THE AIRCREWMAN AT INCREASED RISK OF ISCHEMIC VASCULAR DISEASE
Malcolm C. Lancaster *In* AGARD Current Status in Aerospace Med. May 1975 5 p refs (For availability see N75-29722 20-51)

N75-29729 Defense Dept., Washington, D.C. Office of the Assistant Secretary of Defense for Health and Environment.
A STUDY ON MEDICAL OFFICER CAREER MANAGEMENT AND RETENTION IN THE USA ARMED FORCES
John E. Murphy *In* AGARD Current Status in Aerospace Med. May 1975 13 p refs (For availability see N75-29722 20-51)

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N75-29757*# Agnew Tech-Tran, Woodland Hills, Calif.
TWO MEN IN SPACE
Ya. Golovanov Washington NASA Aug. 1975 6 p Transl. into ENGLISH from Komsolskaya Pravda (USSR), 4 Feb. 1975 p 4 Sponsored by NASA
(NASA-TT-F-16493) Avail: NTIS HC $3.25 CSCL 05E

The psychological effects of long term isolation in space are discussed in terms of preparation of cosmonauts for space flight and evaluation of space flight experiences. J.M.S.

N75-29758*# Agnew Tech-Tran, Woodland Hills, Calif.
VOICES IN ORBIT
V. Kuznetsov and E. Lapayev Washington NASA Aug. 1975 5 p Transl. into ENGLISH from Krasnaya Zvezda (USSR), 7 Jun. 1975 p 3
(Contract NASw-2789)
(NASA-TT-F-16499) Avail: NTIS HC $3.25 CSCL 05E

The use of voice analysis for monitoring the functional and emotional state of the cosmonauts is discussed. Voice communications are carefully analyzed by medical specialists. It is noted that the decrease in muscle tone due to weightlessness and

other flight factors can be measured by changes in the basic vocal frequency; e.g. during the Soyuz 17 flight when Gubarev and Grechko were heard immediately after waking, their voices were so distorted they were momentarily not recognized by flight control operators. The effect of accelerations on voice communications is being studied using centrifuge tests. Currently, research is being conducted on voice analysis by computer, using such speech elements as intensity, intonation, and phrase structure.
Author

N75-29759# Loughborough Univ. of Technology (England). Dept. of Transport Technology.
BEHAVIOURAL OBSERVATIONS OF PASSENGERS BOARDING A SLOW SPEED CONVEYOR L3 accelerator project
N. M. Hawkins, J. Atha, and N. Ashford Nov. 1974 87 p refs Sponsored by Sci. Res. Council
(TT-7411) Avail: NTIS HC $4.75

Ergonomic aspects of passengers conveyor systems are dealt with. A film was taken of passengers loading a slow speed travellator at Heathrow Airport, London. Behavioral analysis of the film established a relationship between a passenger's boarding style and the likelihood of subsequent balance problems. Nonparametric tests of statistical significance, summary table of chi-squared tests and boarding time distributions are presented in annexes. Author (ESRO)

N75-29760# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
DETERMINISTIC MULTIPLE CUE LEARNING. PART 1: EFFECTS OF CUE INTERCORRELATION AND PRESENTATION ORDER
C. L. Truijens and C. A. P. G. VanDerMast 1974 23 p refs Sponsored by Neth. Organ. for the Advan. of Pure Res.
(IZF-1974-20-Pt-1; TDCK-65519-Pt-1) Avail: NTIS HC $3.25

Six groups of nine subjects learned the same rule: there were two correlation conditions and three presentation order conditions. Correlation and order of presentation were factorially combined. Training blocks with knowledge of results (KR) were alternated with testblocks without KR. The composition of the test blocks was identical for all conditions and the presentation order was random. Results indicate that positive correlation between the cues had an adverse effect on achievement, especially on the knowledge of the rule. It is suggested that there is an interaction between the sign of the cue correlation on the one hand and parity vs disparity of sign of the weights in the rule to be learned on the other. Author (ESRO)

N75-29761# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
ON CONTEXT EFFECTS IN SHORT TERM RETENTION
A. A. Bunt 1974 22 p refs Sponsored by Neth. Organ. for the Advan. of Pure Res.
(IZF-1974-28; TDCK-65599) Avail: NTIS HC $3.25

Context effects were examined by comparing the performance at short lists (constant context) with the performance at the same lists presented between a large number of longer lists (variable context). Output order instruction and rehearsal instruction were factorially combined. The following results emerged: (1) the size of the context effect with a free output procedure instruction depends upon the degree to which subjects are inclined to use different output procedures in both contexts; (2) rehearsal affects output order only with a free output order instruction (independently of context) and (3) with constant context the recency effect is relatively large, while with a fixed output procedure instructon this effect coincides with a relatively small primacy effect (with variable context the reverse effects occur). The results are discussed within the framework of a positional retrieval cue theory. Author (ESRO)

N75-29762# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
MISPERCEPTION OF EXPONENTIAL GROWTH. PART 1: NUMERICAL STIMULI
W. A. Wagenaar (Pa. State Univ., Univ. Park) 1974 19 p refs Sponsored by Fulbright-Hays program
(IZF-1974-29-Pt-1; TDCK-65673-Pt-1) Avail: NTIS HC $3.25

Exponential growth in numerical series is grossly underestimated in an intuitive extrapolation task. Subjects extrapolations are described by a model with two parameters; one for underestimation of the nonlinear growth, the other for linear compensation. The size of the effect is considerable; it is not unusual that two thirds of the subjects produce estimates below 10% of the normative value. The effect increases with the exponent of the stimulus series, and with addition of a constant to the stimulus series. Author (ESRO)

N75-29763# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
MISPERCEPTION OF EXPONENTIAL GROWTH. PART 2: GRAPHICAL STIMULI
W. A. Wagenaar (Pa. State Univ., Univ. Park) and S. D. Sagaria (Penna. State Univ., Univ. Park) 1974 13 p ref Sponsored by Fulbright-Hays program
(IZF-1974-30-Pt-2; TDCK-65699-Pt-2) Avail: NTIS HC $3.25

Underestimation of exponential growth in an extrapolation task, demonstrated with numerical stimuli, occurs to the same extent with graphical presentation of the growth process. The previously proposed model provides a good description of the data. Neither special instructions on the nature of exponential growth nor daily experience with growth processes enhance the extrapolations. Author (ESRO)

N75-29764# Illinois Univ., Savoy. Aviation Research Lab.
MANIPULATING THE NUMBER AND TYPE OF ADAPTIVE VARIABLES IN TRAINING
Daniel Gopher, Beverly H. Williges, Robert C. Williges, and Diane L. Damos Oct. 1974 12 p refs
(Contract F44620-70-C-0105; AF Proj. 6813)
(AD-A006229; ARL-74-12/AFOSR-74-7; AFOSR-75-0302TR) Avail: NTIS CSCL 05/9

To investigate the effectiveness of various types and numbers of adaptive variables, 48 subjects performed a two-dimensional pursuit tracking task for five three-minute training sessions. In the factorial design resulting in eight experimental conditions, three variables (frequency of the forcing function, ratio of acceleration to rate control, and the amount of gain in the control stick) were either fixed or adaptive. A transfer and retention task in which the tracking situation changed periodically was used to evaluate the ability of subjects to adjust to change. Each adaptive variable in training was analyzed separately. Results are discussed in terms of stimulus and response similarity, the optimum number of adaptive variables, and the appropriateness of a changing task to evaluate adaptive training. GRA

N75-29765# Illinois Univ., Savoy. Aviation Research Lab.
THE MEASUREMENT OF OPERATOR CAPACITY BY MANIPULATION OF DUAL TASK DEMANDS
Daniel Gopher and Robert A. North Oct. 1974 71 p refs
(Contract F44620-70-C-0105; AF Proj. 9778)
(AD-A006352; ARL-74-21/AFOSR-74-15; AFOSR-75-0409TR) Avail: NTIS CSCL 05/9

This research assessed the potential of a new methodological technique for measuring operator load and individual differences in basic attention capabilities. In addition, a preliminary validation study was conducted to evaluate the new measures as predictors of success in flight training. The performance testing system included a digit-processing, reaction-time task, and a one-dimensional tracking task. Comparisons were made between separate and concurrent performance of these tasks with adaptive adjustment of task difficulty for each subject. Concurrent performance was manipulated in several combinations of performance demands and task priorities. GRA

N75-29766# Illinois Univ., Savoy. Aviation Research Lab.
MAN AS A PRECIOUS RESOURCE: THE ENHANCEMENT OF HUMAN EFFECTIVENESS IN FLIGHT OPERATIONS
Stanley N. Roscoe Oct. 1974 13 p refs
(Contract F44620-70-C-0105; AF Proj. 9778)
(AD-A006353; ARL-74-20/AFOSR-74-14; AFOSR-75-0410TR) Avail: NTIS CSCL 05/9

The enhancement of human effectiveness in flight operations involves the complementary processes of behavioral engineering and the selection and training of personnel: the former serves to reduce the need for the latter; the latter completes the job left undone by the former. Behavioral engineering is discussed

with reference to the intentional effort to design equipment, organize system elements, and develop operational procedures to maximize system performance while minimizing the need to select and train personnel. Research provides objective scientific evidence upon which to base decisions concerning the design of aviation systems and procedures and the selection and training of personnel. Specific research topics are reviewed. GRA

N75-29767# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A STUDY TO DETERMINE THE ADEQUACY OF THE TOOLS AND EQUIPMENT USED BY AIR FORCE WOMEN IN THE CRAFT SKILLS M.S. Thesis
Philip J. Bolalek and Arthur G. Grumblatt, Jr. Jan. 1975 126 p refs
(AD-A006342; SLSR-14-75A) Avail: NTIS CSCL 05/5

The tools and equipment now used in maintenance, electronics, and civil engineering, were designed to meet the needs of a totally male work force. This study addresses the adequacy of the tools and equipment for the women who are now working in these specialties. The method of approaching this potential problem was to obtain the opinions of the women working in these specialties through self-administered questionnaires. If more than ten percent of the respondents in a specialty considered a tool or equipment item to be inadequate, that item was considered inadequate for women in that specialty. Twenty-four items were identified as inadequate; six of these items were inadequate in more than one specialty. This study also collected data on the age, height, weight, and hand length of the women working in these specialties. In addition to the identification of inadequate tools and equipment for women, this study found that some of these items may also be inadequate for men. Additionally, potential problems were discovered with the quality of tools used in these specialties and with the suitability of women for these specialties. GRA

N75-29768# URS/Matrix Co., Falls Church, Va.
EVALUATING MAINTENANCE PERFORMANCE TEST ADMINISTRATOR'S MANUAL AND TEXT SUBJECT'S INSTRUCTIONS FOR CRITERION REFERENCED JOB TASK PERFORMANCE TESTS FOR ELECTRONIC MAINTENANCE Final Report, 1 Jan. 1969 - 16 Jul. 1974
Edgar L. Shriver, John F. Hayes, and William R. Hufhand Jun. 1975 638 p
(Contracts F33615-69-C-1232; F33615-70-C-1695; AF Proj. 1710)
(AD-A005785; AFHRL-TR-74-57-Vol-2-Pt-2) Avail: NTIS CSCL 05/10

The purpose of this document is to furnish a complete copy of the Test Subject's Instructions and the Test Administrator's Handbook for a battery of criterion referenced Job Task Performance Tests (JTPT) for electronic maintenance. Part I of Volume II of this series of documents, reports and describes the development and tryout of this battery of tests. GRA

N75-29769# New Mexico State Univ., University Park. Dept. of Psychology.
A REVIEW OF RECENT MODELS OF ATTENTION Interim Report
M. Gregory Smith Oct. 1974 46 p refs
(Contract F44620-71-C-0072)
(AD-A006155; NMSU-AFOSR-TR-74-3; AFOSR-75-0307TR) Avail: NTIS CSCL 05/10

The problem of inputting diverse signals at high speeds to a trainee remains one of the major bottlenecks in the training of pilots. Attention is the name of the human process--which selects from the signals presented those requiring immediate response, those which must be held in memory for later action, and those which must be integrated with each other and with prior information. How the signal is encoded, the nature of usable encodable signal units, short- and long-term memories, and the interaction of all of these with the arousal system are equally important. This report reviews the present status of concepts of attention and their postulated interactions with some of these other processes. As such it provides a background for research aimed at improving the training procedures employed in jet pilot training. GRA

N75-29770# Hughes Aircraft Co., Culver City, Calif.
METHODS OF HANDLING SEQUENCE EFFECTS IN HUMAN FACTORS ENGINEERING EXPERIMENTS Interim Report, Jul. 1973 - Jul. 1974
Charles W. Simon Dec. 1974 210 p refs
(Contract F44620-72-C-0086; AF Proj. 6813)
(AD-A006240; HAC-P74-541; AFOSR-75-0319TR) Avail: NTIS CSCL 05/5

A common procedure in human factors engineering experiments is to test the same subject sequentially on a series of different experimental conditions. These within-subjects designs produce sequence effects that may be unwanted or of considerable interest depending on the object of the investigators. In this report, the more common sequence effects are identified and a variety of procedures, experimental designs, and statistical techniques to minimize, adjust for, or isolate these effects are described. Some methods of comparing the effectiveness of different treatment presentation orders and for optimizing training schedules are discussed. GRA

N75-29771# School of Applied Aerospace Sciences, Sheppard AFB, Tex.
TRAINING OF ENLISTED WOMEN AS JET AIRCRAFT MAINTENANCE SPECIALISTS Final Report
Thomas M. Longridge, Jr. 9 Aug. 1974 28 p refs
(AD-A006434; Sheppard-PR-74-4) Avail: NTIS CSCL 05/9

The study was conducted to obtain data concerning performance and attitude by sex on members in training in Course 3ABR43131C-1, Aircraft Maintenance Specialist, Jet Aircraft One and Two Engines. Mandatory course prerequisites are normal color vision and either a minimum aptitude percentile of Mechanical 50 or Electronic 50. Because aircraft maintenance includes many job tasks of a general type not ordinarily performed by female personnel before the widespread lifting of assignment restrictions as to sex of member, the career field offers an excellent framework in which to compare males and females with respect to relative success in a technical area. GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N75-29772*# Joint Publications Research Service, Arlington, Va.
DINNER FOR A COSMONAUT
Ya. Tolstikov Washington NASA Jul. 1975 4 p Transl. into ENGLISH from Sots. Industriya (USSR), 18 Jul. 1974 p 4
(NASA-TT-F-16465) Avail: NTIS HC $3.25 CSCL 06H

A visit to a laboratory engaged in developing and testing freeze dried foods for use in space is reported. The general principles and advantages of freeze drying are discussed first, followed by information on the difficulties which have been encountered and solved. About one third of the article specifically deals with use of freeze dried foods in space. On new long term space flights freeze dried foods will make up more than half the space diet. The food packets are described, together with information on how a cosmonaut prepares meals from freeze dried foods. Author

N75-29773*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CONCEPT DESIGN OF THE PAYLOAD HANDLING MANIPULATOR SYSTEM
Jun. 1975 122 p
(NASA-TM-X-72447; JSC-09709) Avail: NTIS HC $5.25 CSCL 05H

The design, requirements, and interface definition of a remote manipulator system developed to handle orbiter payloads are presented. End effector design, control system concepts, and man-machine engineering are considered along with crew station requirements and closed circuit television system performance requirements. J.M.S.

N75-29774*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
HUMAN COMFORT RESPONSE TO RANDOM MOTIONS WITH A DOMINANT VERTICAL MOTION
Ralph W. Stone, Jr. May 1975 89 p refs
(NASA-TM-X-72691) Avail: NTIS HC $4.75 CSCL 05H

Subjective ride comfort response ratings were measured on the Langley Visual Motion Simulator with vertical acceleration inputs with various power spectra shapes and magnitudes. The data obtained are presented. Author

N75-29775*# Kanner (Leo) Associates, Redwood City, Calif.
NEWEST METHODS OF AIR DISTRIBUTION IN CONDITIONING SYSTEMS ON NAVAL TRANSPORT VESSELS
T. I. Yankina Washington NASA Aug. 1975 13 p Transl. into ENGLISH from the book "Vsesoyuznaya Konferentsiya po Elektrosnabzheniya i Konditsionirovaniya Vozdukha na Transporte" Riga, Zinatne Press, 1965 p 217-225
(Contract NASw-2790)
(NASA-TT-F-16498) Avail: NTIS HC $3.25 CSCL 06K

Air conditioning systems newly introduced in Soviet and foreign ships are described as to advantages and comfort conditions afforded. Temperature differences between supply air and room air were used in rating the various conditioning schemes. Author

N75-29776*# Kanner (Leo) Associates, Annapolis, Md.
VIBRATION AS AN ARTIFICIALLY CREATED HUMAN FACTOR OF THE ENVIRONMENT
K. V. Frolov and B. A. Potemkin Washington NASA Jul. 1975 57 p refs Transl. into ENGLISH of the manuscript "Biomekhanika Tela Cheloveka pri Deystvii Vibratsiy" Moscow, Acad. of Sci. USSR, 1975 p 1-50
(Contract NASw-2790)
(NASA-TT-F-16475) Avail: NTIS HC $4.25 CSCL 05H

The characteristics of vibrations acting on man under various production conditions are described. The physiological and mechanical reactions of the human body to vibration are analyzed. Results are presented from experimental studies of the dynamic characteristics of the human body and the arms of an operator. A significant change is demonstrated in the parameters of dynamic models of biomechanical systems with a change in position or degree of muscular tension. The unstable behavior of the dynamic characteristics of the human body under the long-term influence of vibration are analyzed, and a mathematical model of the active changes in the mechanical parameters of the body by man is discussed. Author

N75-29777*# Kanner (Leo) Associates, Redwood City, Calif.
STATUS AND PROSPECTS FOR THE DEVELOPMENT OF AIR CONDITIONING FOR NAVAL VESSELS
V. M. Shamshin Washington NASA Aug. 1975 43 p Transl. into ENGLISH from the book "Vsesoyuznaya Konferentsiya po Elektrosnabzheniya i Konditsionirovaniya Vozdukha na Transporte" Riga, Zinatne Press, 1965 p 5-44
(Contract NASw-2790)
(NASA-TT-F-16457) Avail: NTIS HC $3.75 CSCL 06K

The current state and prospects of air conditioning for ships are discussed. Both comfort air conditioning for passengers and crew, and technical air conditioning for better preservation of bulk cargo and petroleum, as well as hold interior rust reduction, are discussed. Characteristics of some Soviet and foreign systems are presented. Author

N75-29778*# Fairchild Republic Div., Farmingdale, N.Y.
SPACE SHUTTLE/FOOD SYSTEM STUDY. VOLUME 1: TECHNICAL VOLUME, OVEN STUDY Final Report
24 May 1975 97 p
(Contract NAS9-13138)
(NASA-CR-144366) Avail: NTIS HC $4.75 CSCL 06K

The baseline space shuttle galley was designed to utilize lightweight rehydratable foods, to be prepared for consumption by rehydration with chilled or hot water. The impact is examined of an extension of food types to include thermostabilized food, at ambient temperature, and frozen foods on the baseline design of the shuttle galley. Weight, volume, and power penalities associated with heating thermostabilized and frozen foods by means of a hot air convection heating system and a conduction heating system are determined along with the impact on crew/galley interface and meal preparation. J.M.S.

N75-29779*# Fairchild Republic Div., Farmingdale, N.Y.
SPACE SHUTTLE/FOOD SYSTEM STUDY. VOLUME 2: SUPPORTING APPENDICES, OVEN STUDY Final Report
24 May 1975 177 p
(Contract NAS9-13138)
(NASA-CR-144367) Avail: NTIS HC $7.00 CSCL 06K

Calculations and data regarding the development of a galley oven for use in the space shuttle are presented. Heat flow, heat transfer, and food heating characteristics are given for various oven designs. A design approach to guarantee structural reliability is also presented, in which the oven closure, door, and basic mounting points are considered. D.M.L.

N75-29780*# Kanner (Leo) Associates, Redwood City, Calif.
ROBOT MANIPULATORS
Ye. P. Popov Washington NASA Aug. 1975 54 p refs Transl. into ENGLISH from the book "Roboty-Manipulyatory" Moscow, Znaniye Press, 1974 64 p
(Contract NASw-2790)
(NASA-TT-F-16482) Avail: NTIS HC $4.25 CSCL 05H

The general use of robot manipulators is explained and the basics of their design and operation are described for the average reader. Several pages of the first chapter include a discussion on the use of robot manipulators in space. Possibilities for fully and partially automatic robots, robot manipulator and information robots for space shuttles, space stations, and planetary exploration are outlined. The only example given of robots actually used in space is a mention of the Soviet Lunokhod, which is characterized as the initial stage of planetary robot development. A short list of references is included. Author

N75-29781# Royal Aircraft Establishment, Farnborough (England).
HEAD AND NECK MOBILITY OF PILOTS MEASURED AT THE EYE
M. C. Champion and W. G. A. Port Dec. 1974 40 p refs
(RAE-TR-74158; BR44792) Avail: NTIS HC $3.75

Mobility was studied by measuring the movement envelope of nine selected pilots' eye positions as each subject cranes his head and neck up, down, and from side to side. During these movements the subjects looked forward at a target board through a sight aperture. The subjects were strapped into an ejection seat instrumented to monitor harness tension and were clothed in standard RAF summer and winter aircrew equipment assemblies. The effects of wearing a standard RAF Mark 2/3 flying helmet and differences between movement with summer and winter flying clothing were assessed. Author (ESRO)

N75-29782# Royal Aircraft Establishment, Farnborough (England).
STATISTICS IN HUMAN ENGINEERING
K. R. Maslen Dec. 1974 22 p refs
(RAE-TR-74166; BR44996) Avail: NTIS HC $3.25

Elementary concepts (averages, distributions, and correlation) are considered, as well as the more fundamental topics of experimental approach, and the statistical or practical significance of results. A plea is made for more consideration on individual results and less reliance on averages, and for more detailed reporting. Author (ESRO)

N75-29783# Calspan Corp., Buffalo, N.Y.
PERFORMANCE EVALUATION OF NEW GENERATION 50TH PERCENTILE ANTHROPOMORPHIC TEST DEVICES. VOLUME 1: TECHNICAL REPORT Final Report, Jun. 1973 - Aug. 1974
Daniel E. Massing Mar. 1975 240 p refs
(Contract DOT-HS-053-3-664)
(PB-240920/9; CALSPAN-ZS-5352-V-2-Vol-1; DOT-HS-801431) Avail: NTIS HC $7.50 CSCL 06N

Anthropomorphic test dummies developed and designated as the GM-50X were experimentally evaluated to (1) determine the degree of conformance to specifications and (2) establish by sled testing in typical restraint and crash environments their potential for experimental repeatability. A series of eleven static and dynamic component tests were performed to measure the

GM-50X dummies in accordance with the purchase description. The results indicate substantial nonconformance with the specified criteria. GRA

N75-29784# Calspan Corp., Buffalo, N.Y.
PERFORMANCE EVALUATION OF NEW GENERATION 50TH PERCENTILE ANTHROPOMORPHIC TEST DEVICES. VOLUME 2: ACCELERATOR SLED TEST DATA Final Report, Jun. 1973 - Aug. 1974
Daniel E. Massing, Kenneth N. Naab, and Phyllis E. Yates Mar. 1975 569 p
(Contract DOT-HS-053-3-664)
(PB-241121/3; CALSPAN-ZS-5352-V-3-Vol-2) Avail: NTIS HC $13.00 CSCL 13F

Sled test configurations were employed to evaluate the dynamic performance repeatability of the GM 50X dummy. Type 2 belt, pre-inflated air bag, energy absorbing steering column, and Type 1 belt with simulated instrument panel test environments were utilized to measure the performance of two identically fabricated dummies. The graphical results of a statistical analysis is presented. In addition, graphical results of the energy absorbing steering column and simulated instrument panel tests of the GM 50X dummies are presented in raw form. GRA

N75-29785# Bendix Corp., Cocoa Beach, Fla. Launch Support Div.
PROTECTIVE CLOTHING: ASSESSMENT OF NEED, VOLUME 1 Final Report
W. L. Barnhart, C. R. Toney, and L. A. Nicodemus Aug. 1974 213 p
(Contract HSM-99-73-75)
(PB-241167/6; NIOSH-TR-75-01-Vol-1) Avail: NTIS HC $7.25 HC also available from NTIS $16.00/set of 2 reports as PB-241166-SET

The document contains recommendations to conduct research in the general area of industrial/occupational protective clothing aimed toward the development of criteria and performance standards for protective clothing in 27 Industrial/Occupational areas. This work is a valuable contribution to the identification of occupational safety research needs and will undergo immediate and careful analysis by appropriate Institute staff. The recommendations contained in this report do not, however, reflect the Institute's final decisions concerning a priority rating method, the rating of protective clothing, or future research objectives. Modifications in these areas will be made as necessary. GRA

N75-29786# Bendix Corp., Cocoa Beach, Fla. Launch Support Div.
PROTECTIVE CLOTHING: ASSESSMENT OF NEED, VOLUME 2 Final Report
W. L. Barnhart, C. R. Toney, and L. A. Nicodemus Aug. 1974 391 p refs
(Contract HSM-99-73-75)
(PB-241168/4; NIOSH-TR-75-01-Vol-2) Avail: NTIS HC $10.25 HC also available from NTIS $16.00/set of 2 reports as PB-241166-SET

Surveys of 27 industrial areas for assessing research needs toward the development of standards for protective clothing are presented. GRA

N75-29787# Kinergetics, Inc., Tarzana, Calif.
IMPROVED MINE RESCUE BREATHING APPARATUS Final Report, Jul. 1972 - Oct. 1974
W. H. Ryback 24 Oct. 1974 46 p
(Contract DI-BM-HO-220045)
(PB-241105/6; BM-OFR-26-75) Avail: NTIS HC $3.75 CSCL 06G

A self-contained cryogenic breathing apparatus developed for a four hour period of mine rescue work is described. The breathing apparatus failed to receive prototype approval. Further development is recommended to achieve a preproduction prototype. GRA

N75-29788# Army Foreign Science and Technology Center, Charlottesville, Va.
COMPARATIVE CHARACTERISTICS OF THE MAIN TYPES OF CLIMATIC CLOTHING OF VOSTOK STATION PERSONNEL
N. I. Makarov 7 May 1974 10 p refs Transl. into ENGLISH Tr. I. Artich. i Antarkt. Nauchno-Issled. Inst. (USSR), v. 299, 1971 p 231-235
(AD-A005876; FSTC-HT-23-0764-74) Avail: NTIS CSCL 06/17

Research was carried out on various types of clothing used in the Antarctic. The basic KAE suit made of camel hair was found to be the most suitable in extreme weather conditions. The protective properties of clothing can be improved by increasing the amount of air under the clothing. GRA

N75-29723 United Aircraft Corp., Washington, D.C. Hamilton Standard Div.
SPACE LIFE SUPPORT TECHNOLOGY FOR A MODULAR INTEGRATED UTILITY SYSTEM
Edwin J. Wulff *In* AGARD Current Status in Aerospace Med. May 1975 8 p refs (For availability see N75-29722 20-51)

N75-29724 European Space Technology Center, Noordwijk (Netherlands).
HABITABILITY DESIGN IN EUROPE'S SPACELAB: A STATUS REPORT
A. B. Thompson *In* AGARD Current Status in Aerospace Med. May 1975 7 p refs (For availability see N75-29722 20-51)

N75-29725* National Aeronautics and Space Administration, Washington, D.C.
A SUMMARY OF SKYLAB FINDINGS OF INTEREST TO LIFE SCIENTISTS
Walton L. Jones *In* AGARD Current Status in Aerospace Med. May 1975 16 p refs (For availability see N75-29722 20-51)

N75-29727 School of Aerospace Medicine, Brooks AFB, Tex. Biodynamics Branch.
THE PLUS Gz PROTECTIVE METHODS FOR USE IN ADVANCED FIGHTER-ATTACK AIRCRAFT
Robert W. Krutz, Jr., Sidney D. Leverett, Jr., Russell R. Burton, and John W. Burns *In* AGARD Current Status in Aerospace Med. May 1975 7 p refs (For availability see N75-29722 20-51)

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering*.

N75-29789# National Aerospace Lab., Tokyo (Japan).
COMPARATIVE STUDY OF COUNTING METHODS BY DIGITAL SIMULATION
Kosaburo Yamane, Kazuyuki Takeuchi, Koichi Ono, and Hiroo

Asada Feb. 1975 10 p refs In JAPANESE; ENGLISH summary
(NAL-TR-408) Avail: NTIS HC $3.25

Comparison of different counting methods is presented together with the effect of eliminating small amplitude variations on the frequencies. Using a digital computer and two kinds of Gaussian noise, low pass filtered and band pass filtered were simulated and the frequencies were counted by level crossing count, peak count, zero-crossing peak count, and range-mean count methods. The first three methods show a good agreement with Rice's theoretical solution in the higher level, but differed each other in the lower level. When the eliminated amplitude was increased the differences between the three methods decreased, but the differences of the three methods from Rice's solution increased. Range-mean counts were sensitive to the magnitude of the eliminated amplitude and the effect of eliminating small amplitude varied with the shape of power spectral density and the magnitude of the amplitude counted. Also, comparison was made between the range-mean counts and the amplitude frequencies calculated from the three methods of counting mentioned above. Author

N75-29790# Softech, Inc., Waltham, Mass.
A TUTOR MINICOMPUTER SYSTEM Final Report
John W. Brackett 7 Feb. 1975 117 p
(Contract MDA903-74-C-0288; ARPA Order 2517)
(AD-A005782; Rept-1016) Avail: NTIS CSCL 09/2

The study examined the feasibility of a minicomputer-based system for presenting computer-aided instructional material developed in the TUTOR language currently in use on the PLATO System at the University of Illinois. The study developed a system design based upon the Digital Equipment Corporation PDP-11 computer and evaluated the costs of transferring TUTOR programs from the PLATO System to a PDP-11 based system. GRA

N75-29791# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
USE OF A MICROPROCESSOR IN A SUPERVISORY CONTROL APPLICATION
H. J. Binck and J. H. Zouck Dec. 1974 35 p refs
(Contract N00017-72-C-4401)
(AD-A006119; APL-TG-1269) Avail: NTIS CSCL 09/2

This report describes the solution of a propulsion test control problem by implementing supervisory control with an LSI (large-scale integration) microprocessor system. A brief description of the control problem and the test is provided. Primary emphasis is on the specific solution chosen using the microprocessor. The paper discusses programming in the microprocessor, the type of memory used, and how the memory was implemented. The design goals that led to the final configuration are also discussed. The reasons for using the LSI microprocessor are presented, together with its limitations and advantages. Use of a microprocessor in this application reduced hardware costs significantly. Programs were written in the micro processor's assembly language, cross-assembled on another computer, and then burned into programmable read-only memories. Hardware that aided in the programming and debugging is also described. GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N75-29792# National Aerospace Lab., Tokyo (Japan).
SIMULATION OF DIGITAL SYSTEMS CONSISTING OF ELEMENTS WITH PROPAGATION DELAY TIME
Toshio Isobe 1974 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-391) Avail: NTIS HC $3.25

A description is given of the algorithm and computer program for the simulation of digital systems in which all elements have propagation delay time. This program consists of FORTRAN-type subroutines and has two important functions. The first is the ability to simulate strictly the influence of the elements propagation delay. The second is element definition with a certain format subroutine which a user can program with his arbitrary properties. The results are presented for simulating both a half adder and a very small scale computer to demonstrate the efficiency and accuracy of this simulation program. Author

N75-29793# Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.
APPARATUS AND PROGRAMS FOR DIGITAL ANALYSIS OF FLUCTUATING QUANTITIES IN TURBULENT FLOW
A. D. Weir and P. Bradshaw Oct. 1974 28 p refs Supersedes IC-Aero-72-11; N74-11047
(Grant SRC-B/SR/8978)
(IC-Aero-74-09) Avail: NTIS HC $3.75

A general description is given of the apparatus used to produce a digital record of several simultaneous fluctuating signals corresponding to different velocity components at one point in a turbulent flow, and of the programs used to analyze the data. A glossary and details of coding are presented in annexes. Author (ESRO)

N75-29794# National Physical Lab., Teddington (England). Div. of Numerical Analysis and Computing.
PANGLOSS: A SYSTEM FOR READING AND CHECKING FILES
R. S. Scowen Jan. 1975 37 p refs
(NPL-NAC-59) Avail: NTIS HC $3.75

The applications of PANGLOSS, including data validation and syntax checking are described. The structure of a data file is defined by means of a program in the PANGLOSS language. The PANGLOSS compiler processes this program and produces as output a program which reads the data file and checks its structure. Use of PANGLOSS on a KDF9 computer is also described. ESRO

N75-29795# Integrated Systems Support, Inc., Falls Church, Va.
A PRODUCTION ENVIRONMENT EVALUATION OF INTERACTIVE PROGRAMMING Final Report
J. Reaser, I. Priesman, and J. F. Gill Dec. 1974 74 p refs
(Contract DAAK02-72-C-0529)
(AD-A006502) Avail: NTIS CSCL 09/2

This report describes an evaluation of interactive programming versus batch programming within an actual software production environment at the U.S. Army Computer Systems Command. The purpose of the study was to determine the productivity and cost effectiveness differences between the two modes of operation. The study was conducted in a production environment with the programmers completing their normally required workload and providing documentation on tasks routinely assigned to them. The results of this study indicate that on a line-of-code basis the interactive system offers an increase in productivity and a decrease in overall cost, as compared to the batch processing procedure. Continued support of the interactive system is recommended. GRA

N75-29796# California Univ., Los Angeles. Western Management Science Inst.
PARAMETRIC INTEGER PROGRAMMING
Robert M. Nauss Jan. 1975 152 p refs
(Contract N00014-69-A-0200-4042)
(AD-A006401; WMSI-Working-Paper-226) Avail: NTIS CSCL 12/2

A parametric integer linear program (PILP) may be defined as a family of closely related integer linear programs (ILP). Within this definition the author incorporates not only continuous scalar parameterizations but also finite parameterizations. These may include an ILP with a finite number of objective functions or right hand sides or constraint matrices or any combination of these. A general framework for PILP is presented. It begins by outlining the need for PILP algorithms. Basic solution methodologies are explained and two rudimentary approaches for the PILP are stated. Theoretical properties for special parameterizations are proved, and techniques for improving algorithmic efficiency are discussed. The framework concludes with an examination of underlying factors which intimately relate to the scheduling of solution priorities in a PILP algorithm. GRA

N75-29797# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
OPTIMIZING THE EFFICIENCY OF COMPUTER-AIDED INSTRUCTION Final Report
Wallace Feurzeig, George Lukas, and Ned Benhaim Jan. 1975 52 p refs
(Contract F44620-74-C-0009; AF Proj. 9778)
(AD-A006424; BBN-2992; AFOSR-75-0306TR) Avail: NTIS CSCL 05/9

The report describes the development and testing of an adaptive training model for optimizing path sequencing in computer-aided instruction so as to minimize training time. The model was applied to a block of the Programming Specialist Course given at Sheppard AFB, Texas. Computer program implementation of the model and CAI course materials was done through use of the PLATO IV CAI system. Trial of the resulting course materials on-line by expert instructors was performed. GRA

N75-29798# Massachusetts Inst. of Tech., Cambridge.
CAMAC: GROUP MANIPULATION SYSTEM Interim Scientific Report
Randell B. Weiss Mar. 1975 7 p
(Grant NSF P4P0460-000; Proj. MAC)
(PB-240495/2; MAC-TM-60) Avail: NTIS HC $3.25 CSCL 09B

The CAMAC is a collection of group manipulation programs with an easy to use interface. With groups defined by either generating permutations or generators and relations, the system can find coset tables, normalizers, centralizers, stabilizers, orbits, conjugacy classes, and isomorph classes of combinatorial objects, etc. GRA

N75-29799# Stanford Univ., Calif.
A HYPOTHETICAL DIALOGUE EXHIBITING A KNOWLEDGE BASE FOR A PROGRAM UNDERSTANDING SYSTEM
Cordell Green and David Barstow Jan. 1975 42 p refs
(Contract DAHC15-73-C-0435; ARPA Order 2494)
(AD-A006294; SU-STAN-CS-75-476; SU-AIM-258) Avail: NTIS CSCL 09/2

A hypothetical dialogue with a fictitious program-understanding system is presented. In the interactive dialogue the computer carries out a detailed synthesis of a simple insertion sort program for linked lists. The content, length and complexity of the dialogue reflect the underlying programming knowledge which would be required for a system to accomplish this task. The nature of the knowledge is discussed and the codification of such programming knowledge is suggested as a major research area in the development of program-understanding systems. GRA

N75-29800# Texas Univ., Austin. Center for Cybernetic Studies.
CHARACTERIZATION OF OPTIMALITY IN CONVEX PROGRAMMING WITHOUT A CONSTRAINT QUALIFICATION
Aharon Ben-Tal, Adi Ben-Israel, and S. Zlobec Dec. 1974 34 p refs Prepared in cooperation with McGill Univ., Montreal and Technion - Israel Inst. of Tech., Haifa
(Contracts N00014-67-A-0126-0008; N00014-67-A-0009; NR Proj. 047-021)
(AD-A005903; CCS-210) Avail: NTIS CSCL 12/2

Necessary and sufficient conditions of optimality are given, for convex programming problems, with no constraint qualification. The optimality conditions are stated in terms of consistency or inconsistency of a family of systems of linear inequalities and cone relations. GRA

N75-29801# Texas Univ., Austin. Center for Cybernetic Studies.
PRIMAL GEOMETRIC PROGRAMS TREATED BY LINEAR PROGRAMMING
Aharon Ben-Tal and Adi Ben-Israel Jul. 1974 46 p refs
(Contracts N00014-67-A-0126-0008;
N00014-67-A-0126-0009; Grants NSF GP-38867;
AF-AFOSR-2516-73; NR Proj. 047-021)
(AD-A005902; CCS-187) Avail: NTIS CSCL 12/2

Necessary and sufficient optimality conditions, requiring no constraint qualifications, are given in terms of associated linear programs which also serve in the characterization of, and the reduction to, canonical programs. An iterative method for solving superconsistent geometric programs, based on the above conditions, is described. GRA

N75-29802# Texas Univ., Austin. Center for Cybernetic Studies.
V-POSITIVITY, POVERSES AND AN ECONOMIC GLOBAL UNICITY THEOREM OF GALE AND NIKAIDO
A. Charnes, W. Raike, and J. Stutz Jun. 1974 14 p refs Prepared in cooperation with Naval Postgraduate School, Monterey, Calif.
(Contract N00014-67-A-0126-0009; NR Proj. 047-021)
(AD-A005901; CCS-182) Avail: NTIS CSCL 12/2

Strong theorems concerning globally unique solutions to nonlinear inequalities have been obtained by Gale and Nikaido via P-matrix characterizations of the Jacobians of the mappings involved. The authors introduce two new concepts here: v-positivity and the poverse. These permit the authors to state and prove significant generalizations of the theorems just mentioned and, equally important, provide access to preliminary results concerning linear inequalities by the powerful direct techniques of linear programming theory. GRA

N75-29803# Ohio State Univ., Columbus. Computer and Information Science Research Center.
A MODEL FOR DATA SECURE SYSTEMS, PART 2
D. K. Hsiao and E. J. McCauley, III Oct. 1974 47 p refs
(Contract N00014-67-A-0232-0022)
(AD-A006276; OSU-CISRC-TR-74-7-Pt-2) Avail: NTIS CSCL 09/2

The major portion of this report is devoted to the development and discussion of a Structural Model. The authors expand upon the conceptual model introduced in Part I to include a discussion of the overall data base structure and algorithms for its maintenence and use. The atom concept is improved to reflect more accurately the nature of security specifications. The concept is unified with the concept of storage cell in the model for the study of protection completeness and access and storage efficiency. The model shows that proper utilization of the atom and cell concepts can result in a data secure system with effective protection and efficient access. Furthermore, these concepts can lend themselves toward storage compartmentalization of data aggregates for security purpose. Several examples are developed with sufficient details to illustrate the utilization. GRA

N75-29804# Mitre Corp., Bedford, Mass.
REMOTE-TERMINAL EMULATOR (DESIGN VERIFICATION MODEL): USER'S MANUAL
T. Suyemoto Feb. 1975 216 p refs
(Contract F19628-75-C-0001; AF Proj. 572D)
(AD-A006193; MTR-2677-Vol-10; ESD-TR-74-314) Avail: NTIS CSCL 09/2

The Remote-Terminal Emulator is a minicomputer-based system which generates message traffic for use in testing and evaluating large-scale, multi-terminal computer systems. This series of reports will describe the two Design Verification Models that were developed on Data General NOVA 800 minicomputers. This volume is a user's manual which contains the information necessary to prepare and run the software portions of the Remote-Terminal Emulator. GRA

N75-29805# AMS, Inc., Claremont, Calif.
DEVELOPMENTS IN COMPUTER AIDED SOFTWARE MAINTENANCE
R. K. Overton Sep. 1974 265 p refs
(Contract F19628-74-C-0061; AF Proj. 2801)
(AD-A005827; ESD-TR-74-307) Avail: NTIS CSCL 09/2

Data were collected on two aspects of maintenance programming (which, according to published estimates, costs the U.S. approximately five billion dollars a year). Aspects were (1) arrangement and sources of information at graphics consoles, and (2) the value of conceptual groupings to maintenance programmers using FORTRAN and PL/1. At consoles, there is a need for a better matching of problem-solving facilities with the level of abstraction or detail at which the programmer happens to be working. Scattered sources of needed information were a

handicap, as was distraction and other factors. It would be possible to develop some techniques for reducing these handicaps. Pilot programs were developed to automate display of conceptual groupings. In at least some cases, such programs decidedly improve maintenance efficiency. Further development and wider usage of such programs is warranted. GRA

62 COMPUTER SYSTEMS

Includes computer networks.

No abstracts in this category.

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support*.

N75-29806# General Research Corp., McLean, Va. Operations Analysis Div.

CARMONETTE. VOLUME 1. GENERAL DESCRIPTION Final Report, 1 Apr. - 15 Nov. 1974

Gary S. Colonna and Richard G. Williams Nov. 1974 79 p refs

(Contract DAAG39-74-C-0128)

(AD-A007843; OAD-CR-73-Vol-1; USACAA-D-74-11-Vol-1) Avail: NTIS CSCL 15/7

The report contains an overview of the CARMONETTE ground combat simulation. A brief discussion of model organization, application, and outputs is included. The mathematical models and history of the model are contained in annexes to this volume. GRA

N75-29807# General Research Corp., McLean, Va. Operations Analysis Div.

CARMONETTE. VOLUME 2. DATA PREPARATION Final Report, 1 Apr. - 15 Nov. 1974

Gary S. Colonna and Richard G. Williams Nov. 1974 260 p refs

(Contract DAAG39-74-C-0128)

(AD-A007844; OAD-CR-73-Vol-2; USACAA-D-74-11-Vol-2) Avail: NTIS CSCL 15/7

The document contains a gamer's manual that describes the sources and handling of data required by the simulation, the interpretation of preprocessor outputs, the operation of the battle model, and the interpretation of game outputs. GRA

N75-29808# General Research Corp., McLean, Va. Operations Analysis Div.

CARMONETTE. VOLUME 3. TECHNICAL DOCUMENTATION Final Report, 1 Apr. - 15 Nov. 1974

Richard G. Williams Nov. 1974 292 p refs

(Contract DAAG39-74-C-0128)

(AD-A007845; OAD-CR-73-Vol-3; USACAA-D-74-11-Vol-3) Avail: NTIS CSCL 15/7

The report is a programmer's manual that describes, in detail, the model logic, data handling, and operation. It contains descriptions of labeled commons, subroutines, and has flow charts for the majority of subroutines. A running guide for both Control Data and UNIVAC versions of the model is included. GRA

N75-29809# Stanford Univ., Calif. Dept. of Computer Science.

COMPUTER GENERATION OF NATURAL LANGUAGE FROM A DEEP CONCEPTUAL BASE

Neil Murray Goldman Jan. 1974 321 p refs

(Contract DAHC15-73-C-0435; Grant NSF GI-42906; ARPA Order 2494)

(AD-A005041; SU-Stan-CS-74-461; SU-Aim-247) Avail: NTIS CSCL 09/2

For many tasks involving communication between humans and computers it is necessary for the machine to produce as well as understand natural language. The author describes an implemented system which generates English sentences from Conceptual Dependency networks, which are unambiguous, language-free representations of meaning. The system is designed to be task independent and thus capable of providing the language generation mechanism for such diverse problem areas as question answering, machine translation, and interviewing. GRA

N75-29810# New Mexico State Univ., University Park. Engineering Experiment Station.

CONTROL TECHNIQUES FOR PRODUCTION PROCESSES USING BAYESIAN ESTIMATION AND EXPONENTIAL SMOOTHING Final Report

Satish J. Kamat Mar. 1975 182 p refs

(Grant NSF ENG-73-08107)

(PB-241142/9; NMSU-EES-244-72) Avail: NTIS HC $7.00 CSCL 13H

Control procedures were developed for production processes where the quality characteristic can be described by a continuous random variable with control specifications of mean, variance, and fraction defective. Under the mean specification a linear shift and a step shift model were used separately. Monte Carlo simulation was performed for both these procedures under mean specification and compared against the corresponding x-bar charts and cumulative sum charts using total cost as the criterion. Based on the analysis of variance and a five percent significance level, the procedures developed were better than the existing charts for ratios of the unit cost of a corrective action to the unit cost of a defective unit that can be expected in practice. GRA

N75-29811# Stanford Univ., Calif. Dept. of Computer Science.

COMPUTATIONAL UNDERSTANDING: ANALYSIS OF SENTENCES AND CONTEXT

Christopher Kevin Riesbeck May 1974 249 p refs

(Contract DAHC15-73-C-0435; Grant MH-06645; ARPA Order 2494)

(AD-A005040; SU-STAN-CS-74-437; SU-AIM-238) Avail: NTIS CSCL 05/7

The goal of this thesis was to develop a system for the computer analysis of written natural language texts that could also serve as a theory of human comprehension of natural language. Therefore the construction of this system was guided by four basic assumptions about natural language comprehension. First, the primary goal of comprehension is always to find meanings as soon as possible. Other tasks, such as discovering the syntactic relationships, are performed only when essential to decisions about meaning. Second, an attempt is made to understand each word as soon as it is read, to decide what it means and how it relates to the rest of the text. Third, comprehension means not only understanding what has been seen but also predicting what is likely to be seen next. Fourth, the words of a text provide the cues for finding the information necessary for comprehending that text. GRA

N75-29812# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.

SYLLABLE DETECTION IN CONTINUOUS SPEECH

D. C. Sargent and K. S. Fu Sep. 1974 49 p refs

(Grant AF-AFOSR-2661-74)

(AD-A005718; TR-EE74-38; AFOSR-75-0339TR) Avail: NTIS CSCL 05/7

The report describes a syllable detection program which will provide sufficient knowledge about the presence of syllables in a speech passage to permit automatic stress contour analysis. The syllable detection program was designed for use in a top-down speech recognition system. Therefore, one of the significant features of the program is its ability to obtain an estimate on syllable placement without first attempting phonetic recognition. P-P amplitude and RMS intensity were separately used for the syllable detection work. 85.7% recognition rate was obtained from the use of P-P amplitude and 82.6% from RMS intensity. The results were discussed and error types analyzed. When both the amplitude and power spectrum measurements were used, the syllable detection rate can be improved up to 91.7%. GRA

N75-29813# System Development Corp., Santa Monica, Calif.
A PHONOLOGICAL RULES SYSTEM
J. A. Barnett 24 Jan. 1975 53 p refs
(Contract DAHC15-73-C-0080; ARPA Order 2254)
(AD-A005826; SDC-TM-5478/000/00) Avail: NTIS CSCL 17/2

A phonological rules system has been implemented as a language extension of SDC INFIX LISP. The system can be used in two modes: as an interactive rule tester, and as a library of functions with other LISP programs. The key language capabilities are: definitions of phonological rules; definitions of ordered rule application; definitions of unordered rule application, definitions of nondeterministic rule application; lexicon definitions; sub-lexicon definitions; and multiple forms for words in the lexicon. The key system capabilities and features are: ability to edit and recompile all definitions; ability to output symbolics to a terminal, printer, or disk file in a format that allows recompilation; ability to selectively test a rule or group of rules against a single form, a lexicon entry, a sub-lexicon, or the entire lexicon; and all phonological rule definitions and all rule applying subr definitions are compiled rather than interpreted. GRA

N75-29814# Johns Hopkins Univ., Baltimore, Md. Dept. of Electrical Engineering.
COMPLETE IDENTIFICATION OF A CLASS OF NONLINEAR SYSTEMS FROM STEADY STATE FREQUENCY RESPONSE Scientific Interim Report, 25 Sep. - 30 Dec. 1974
Stephen L. Baumgartner and Wilson J. Rugh 30 Dec. 1974 27 p refs
(Contract F33615-75-C-1001; AF Proj. 7071)
(AD-A005829; JHU-EE-74-11; ARL-75-0064) Avail: NTIS CSCL 12/1

Based on steady-state frequency response the authors solve the identification problem for a class of nonlinear systems. This class is composed of certain interconnections of stable linear dynamic systems and integer power nonlinearities. Two kinds of measurements are considered. The first involves obtaining the amplitude and relative phase of each harmonic of the steady-state frequency response while the second involves measuring the amplitudes only. In each case the authors find the number of measurements sufficient to identify a system for which the highest power presents, and bounds on the dimensions of the linear subsystems are known. GRA

N75-29815# Rice Univ., Houston, Tex. Dept. of Mechanical and Aerospace Engineering and Materials Science.
A HYBRID APPROACH TO OPTIMAL CONTROL PROBLEMS WITH BOUNDED STATE. PART 1: THEORY
A. Miele, J. L. Tietze, and J. R. Cloutier 1974 56 p
(Grant AF-AFOSR-2185-72; AF Proj. 9749)
(AD-A006191; AFOSR-75-0262TR-Pt-1; AAR-114) Avail: NTIS CSCL 12/1

This paper considers the numerical solution of optimal control problems involving a functional I subject to different constraints, a state inequality constraint, and terminal constraints. The problem is to find the state x(t), the control u(t), and the parameter pi so that the functional is minimized, while the constraints are satisfied to a predetermined accuracy. GRA

N75-29816# California Univ., Los Angeles. System Science Dept.
IDENTIFICATION OF CONTINUOUS TIME DYNAMICAL SYSTEMS WITH UNKNOWN NOISE COVARIANCE Ph.D. Thesis
Arunabha Bagchi 1974 82 p refs
(Grant AF-AFOSR-2492-73; AF Proj. 9769)
(AD-A005885; AFOSR-75-0273TR) Avail: NTIS CSCL 12/1

The present dissertation is a study of identifying parameters of a continuous-time dynamical system with noisy observation and with or without noise in the state of the system. In identifying parameters of a continuous-time dynamical system, the difficulty arises when the observation noise covariance is unknown. The present paper solves this problem in the case of a linear time invariant system with white noise affecting additively both the state and the observation. Likelihood functional cannot be obtained when the observation noise covariance is unknown. A similar procedure, however, works and the estimates are obtained by finding roots of an appropriate functional. It is shown that the estimates obtained are weakly consistent. In the special case of no noise in the state, it is further shown that similar procedure yields estimates that are strongly consistent. Consistency is proved under certain sufficient condition called the Identifiability Condition. This condition is studied in detail and computational algorithm for determining the estimates is discussed. GRA

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N75-29817 British Library Lending Div., Boston Spa (England).
AN APPROXIMATE METHOD OF SOLVING BOUNDARY VALUE PROBLEMS
V. O. Dorohov and L. J. Skljarov [1974] 10 p refs Transl. into ENGLISH from Ukr. RSR, Dopovidi, Ser. A, Fiz. Teh. Mat. Nauk (USSR), no. 2, 1974 p 103-106 In ENGLISH and RUSSIAN
(BLL-M-23691-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 1 BLL photocopy coupon

A lattice projection method for solving boundary value problems is introduced. The method provides approximate solutions in the form of a single analytical expression for practically all domains with a piecewise smooth contour. Theorems and proofs are also given. Author

N75-29818*# Science Applications, Inc., Huntsville, Ala.
MONTE CARLO VARIANCE REDUCTION STUDY
N. R. Byrn 31 Jul. 1975 207 p refs
(Contract NAS8-27541)
(NASA-CR-120672; SAI-76-558-HU) Avail: NTIS HC $7.25 CSCL 12A

A mathematical analysis of the transport of nuclear radiation through matter is presented. A computer test bed that was developed is shown, along with flow charts. J.R.T.

N75-29819*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE STRUCTURE OF ROBUST OBSERVERS
S. P. Bhattacharyya 31 Jul. 1975 30 p refs
(NASA-TM-X-64950) Avail: NTIS HC $3.75 CSCL 12A

Conventional observers for linear time-invariant systems are shown to be structurally inadequate from a sensitivity standpoint. It is proved that if a linear dynamic system is to provide observer action despite arbitrary small perturbations in a specified subset of its parameters, it must: (1) be a closed loop system, be driven by the observer error, (2) possess redundancy, the observer must be generating, implicitly or explicitly, at least one linear combination of states that is already contained in the measurements, and (3) contain a perturbation-free model of the portion of the system observable from the external input to the observer. The procedure for design of robust observers possessing the above structural features is established and discussed. Author

N75-29820*# Behavioral Technology Consultants, Silver Spring, Md.
STEPWISE ITERATIVE FOURIER TRANSFORM: THE SIFT
Vernon A. Benignus and Gayla Benignus Jul. 1975 58 p refs
(Contract NAS9-13703)
(NASA-CR-144377) Avail: NTIS HC $4.25 CSCL 12A

A program, designed specifically to study the respective effects of some common data problems on results obtained through stepwise iterative Fourier transformation of synthetic data with known waveform composition, was outlined. Included in this group were the problems of gaps in the data, different time-series lengths, periodic but nonsinusoidal waveforms, and noisy (low signal-to-noise) data. Results on sinusoidal data were also compared with results obtained on narrow band noise with similar characteristics. The findings showed that the analytic procedure under study can reliably reduce data in the nature of (1) sinusoids in noise, (2) asymmetric but periodic waves in noise, and (3) sinusoids in noise with substantial gaps in the data. The program was also able to analyze narrow-band noise

well, but with increased interpretational problems. The procedure was shown to be a powerful technique for analysis of periodicities, in comparison with classical spectrum analysis techniques. However, informed use of the stepwise procedure nevertheless requires some background of knowledge concerning characteristics of the biological processes under study. Author

N75-29821*# Rice Univ., Houston, Tex. Inst. for Computer Services and Applications.

OPTIMAL LINEAR AND NONLINEAR FEATURE EXTRACTION BASED ON THE MINIMIZATION OF THE INCREASED RISK OF MISCLASSIFICATION

Rui J. P. DeFigueiredo Jun. 1974 12 p refs
(Contract NAS9-12776)
(NASA-CR-144385; ICSA-275-025-014) Avail: NTIS HC $3.25 CSCL 12A

General classes of nonlinear and linear transformations were investigated for the reduction of the dimensionality of the classification (feature) space so that, for a prescribed dimension m of this space, the increase of the misclassification risk is minimized. Author

N75-29822# Loughborough Univ. of Technology (England). Dept. of Transport Technology.

A DIRECT METHOD FOR THE GENERATION OF SHAPE FUNCTIONS OF ANY DESIRED CONTINUITY FOR RECTANGULAR FINITE ELEMENTS

S. Gopalacharyulu Jan. 1975 32 p refs
(TT-7501) Avail: NTIS HC $3.75

A direct method is presented for the generation of shape functions, for rectangular finite elements, with any desired continuity of the shape functions across the inter-element boundaries, i.e. the shape functions can be of any prescribed class C(n), N = 0, 1,2,3.... The method is illustrated with seven examples, four of which are previously published elements. The other three examples represent new elements, two of which are conforming C(1) elements, and the third one is of class C(2). One of the C(1) elements and the C(2) element reproduce exactly all the terms up to the sextic polynomial. Author (ESRO)

N75-29823# Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.

THALIA: A ONE-DIMENSIONAL MAGNETOHYDRODYNAMIC STABILITY PROGRAM USING THE METHOD OF FINITE ELEMENTS

K. Appert, D. Berger, R. Gruber, F. Troyon, and K. V. Roberts (Culham Lab.) Oct. 1974 36 p refs Sponsored by Swiss Natl. Sci. Found.
(LRP-87/74) Avail: NTIS HC $3.75

The program treats the ideal MHD equations by the method of Ritz-Galerkin. Finite elements are taken as basis functions. This program is used to determine the MHD instabilities of infinitely extended cylindrical plasmas confined by magnetic fields. Starting from an equilibrium, eigenmodes are examined which can be pure oscillations (stable case), pure growing modes (unstable case), or purely damped modes. The basic equations, equilibrium, boundary, and regularity conditions of the problem are described. Representation of the displacement vector by a special class of finite elements is described, together with the construction of the matrices A and B which define an eigenvalue problem 2, solved by simultaneous inverse vector iteration by the band matrix package HYMNIA. Program flow and various subroutines are explained, together with a set of tests with their input and output. The structure of THALIA is based on the OLYMPUS package. THALIA is written in STANDARD FORTRAN apart from the use of the NAMELIST input facility. Author (ESRO)

N75-29824# Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.

HYMNIA: BAND MATRIX PACKAGE FOR SOLVING EIGENVALUE PROBLEMS

R. Gruber Feb. 1975 30 p refs Sponsored by Fonds Natl. Suisse de la Rech. Sci.
(LRP-90/75) Avail: NTIS HC $3.75

A specific type of problem (Ax = LBx) where A is real symmetric or hermitian and B positive definite is presented. The problem is solved by the method of simultaneous inverse vector iteration. The main program is described together with some unusual features. The shift of the eigenvalue problem, the decomposition of A and B band matrices, the rounding errors, the number of negative eigenvalues, starting vectors, iteration for eigenvectors, and iteration stop criterion are detailed. Timing for decompositions and iterations, orthonormalization, and backward substitution are discussed. ESRO

N75-29825# Wisconsin Univ., Madison. Mathematics Research Center.

ON REMAINDERS AND THE CONVERGENCE OF CARDINAL SPLINE INTERPOLATION FOR ALMOST PERIODIC FUNCTIONS

I. J. Schoenberg Dec. 1974 31 p refs Sponsored in part by the Weizman Inst. of Sci., Rehovot, Israel
(Contract DA-ARO(D)-31-124-462)
(AD-A006544; MRC-TSR-1514) Avail: NTIS CSCL 12/1

It is shown that cardinal spline interpolation of degree 2m-1 converges, as m nears infinity, for a certain class of almost periodic functions. GRA

N75-29826# Wisconsin Univ., Madison. Mathematics Research Center.

AN H SUP (-1) GALERKIN METHOD FOR PARABOLIC PROBLEMS IN A SINGLE SPACE VARIABLE

Mary F. Wheeler (Rice Univ., Houston, Texas) Jan. 1975 28 p refs
(Contract DA-ARO(D)-31-124-462)
(AD-A006541; MRC-TSR-1463) Avail: NTIS CSCL 12/1

This paper is an extension of the H sup (-1) Galerkin procedure for two-point boundary value problems to parabolic problems in a single space variable. Global estimates are derived and some superconvergence results are demonstrated. GRA

N75-29827# Wisconsin Univ., Madison. Mathematics Research Center.

SPLINE APPROXIMATION TO THE SOLUTION OF THE LINEAR FREDHOLM INTEGRAL EQUATION OF THE SECOND KIND

Arun N. Netravali and Rui J. P. DeFigueiredo Jan. 1975 26 p refs
(Contracts DA-ARO(D)-31-124-462; NSF GK-36375)
(AD-A006539; MRC-TSR-1343) Avail: NTIS CSCL 12/1

A global approximation to the solution of a general linear Fredholm integral equation of the second kind is constructed by means of the cubic spline quadrature. Under appropriate smoothness restrictions on the kernel and the forcing function, convergence of the approximation and of several of its derivatives is established and error bounds are obtained. GRA

N75-29828# Wisconsin Univ., Madison. Mathematics Research Center.

ON THE EMPIRICAL BAYES APPROACH TO MULTIPLE DECISION PROBLEMS

J. VanRyzin and V. Susarla Jan. 1975 31 p refs
(Contracts DA-ARO(D)-31-124-462; Grant NSF GP-31931)
(AD-A006543; MRC-TSR-1484) Avail: NTIS CSCL 12/1

This paper presents general inequalities and theorems for the empirical Bayes multiple decision problem with particular applications to a classification problem and a linear-loss monotone multiple decision problem. GRA

N75-29829# Indiana Univ., Bloomington. Dept. of Mathematics.

COMPLETE FAMILIES OF SOLUTIONS FOR PARABOLIC EQUATIONS WITH ANALYTIC COEFFICIENTS Interim Report

David Colton 1974 27 p refs
(Grant AF-AFOSR-2592-74; AF Proj. 9749)
(AD-A005820; AFOSR-75-0246TR) Avail: NTIS CSCL 12/1

A complete family of solutions is constructed for the general linear second order parabolic equation in one space variable with entire coefficients defined in a domain with moving boundary and for a class of second order parabolic equations in two space variables with entire coefficients defined in a cylindrical domain. The construction is based on the use of integral operators and results on the analytic continuation of solutions to partial

differential equations with analytic coefficients. A numerical example is given which uses a complete family of solutions to approximate the solution to the first initial-boundary value problem for a parabolic equation in one space variable defined in a cylindrical domain. GRA

N75-29830# Indiana Univ., Bloomington. Dept. of Mathematics.

CONVERGENCE OF HIGHER ORDER PSEUDOPARABOLIC PARTIAL DIFFERENTIAL EQUATIONS Interim Report

William Rundell 10 Dec. 1974 34 p refs

(Grant AF-AFOSR-2592-74; AF Proj. 9749)

(AD-A005823; AFOSR-75-0180TR) Avail: NTIS CSCL 12/1

In this paper the author derives conditions under which the solution to an initial boundary value problem for the pseudo-parabolic equation (M sub epsilon) Partial ((d sup P)(u))/partial ((d) (t sup p)) + Lu = f as the operator M sub epsilon becomes close to the identity. Here M sub epsilon and L are elliptic differential operators of order 2m and 2l respectively. Equations of pseudoparabolic type have numerous physical applications. Their first appearance in the literature was in a paper by Milne who considered the diffusion of radiation through a gas filled container. More recent applications include problems involving seepage of fluids through fissured rocks, unsteady flows of second order fluids, the consolidation of clays, and thermodynamic theory of two temperatures. In all of the above mentioned applications the pseudoparabolic equation appears as a singular perturbation of a parabolic equation arising in the classical theory, that is M sub epsilon is close to the identity. From a physical standpoint it is thus entirely reasonable that solutions of the first equation should converge to those of the second under the boundary conditions specified by the physical theories. It will be shown in this paper that for these physical models such convergence does indeed hold. GRA

N75-29831# Indiana Univ., Bloomington. Dept. of Mathematics.

THE APPROXIMATION OF SOLUTIONS TO INITIAL-BOUNDARY VALUE PROBLEMS FOR PARABOLIC EQUATIONS IN ONE SPACE VARIABLE

David Colton 1974 22 p refs

(Grant AF-AFOSR-2592-74; AF Proj. 9749)

(AD-A006233; AFOSR-74-0251TR) Avail: NTIS CSCL 12/1

Integral operators were used to obtain solutions to the initial boundary value problems. The approach provides an analog of the method of separation of variables and the method of images for the heat equation, and is an extension of the use of integral operator methods for approximating solutions of boundary value problems for elliptic equations. M.J.S.

N75-29832# North Carolina Univ., Chapel Hill. Dept. of Biostatistics.

SOME CONTRIBUTIONS TO MULTIVARIATE NONPARAMETRIC METHODS Final Report, 1 Jul. 1971 - 30 Jun. 1974

P. K. Sen Nov. 1974 32 p refs

(Contract F33615-71-C-1927; AF Proj. 7071)

(AD-A006154; ARL-74-0139) Avail: NTIS CSCL 12/1

Invariance principles for empirical processes, functionals of empirical distributions as well as of rank statistics provide useful tools for sophisticated studies of the distribution theory of these statistics. These results are also useful in the developing area of nonparametric sequential analysis. A general account of these invariance principles (with especial emphasis on the contributions by the principal investigator) is given here and their roles in (multivariate) nonparametric methods is discussed. Nonparametric classification procedures, mainly, the ones developed by S. K. Chatterjee, are also considered here. Finally, for the classical multivariate analysis of variance problems, especially, in the context of the so called growth curve models, the robustness of parametric procedures in the Behrens-Fisher situation, as has been studied by S. R. Chakravorti, is presented. GRA

N75-29833# Indiana Univ., Bloomington. Dept. of Mathematics.

INTEGRAL OPERATORS FOR PARABOLIC EQUATIONS AND THEIR APPLICATION

David Colton 1974 24 p refs

(Grant AF-AFOSR-2592-74; AF Proj. 9749)

(AD-A006244; AFOSR-75-0247TR) Avail: NTIS CSCL 12/1

It is the purpose of this paper to outline some recent progress that has been made in the construction of integral operators for parabolic equations in one space variable and to indicate some of the possible applications of these operators. Considerable progress has also been made in the area of parabolic equations in two space variables, and the author hopes to provide a survey of these results at a future date. GRA

N75-29834# Drexel Univ., Philadelphia, Pa. Dept. of Mathematics.

RATIONAL APPROXIMATIONS TO THE SOLUTION OF FREDHOLM INTEGRAL EQUATIONS Final Report, 1 Jun. - 31 Dec. 1974

Jet Wimp and Wyman Fair 1974 4 p refs

(Grant AF-AFOSR-2288-72; AF Proj. 9749)

(AD-A006458; AFOSR-75-0308TR) Avail: NTIS CSCL 12/1

The report explains an algorithm which was developed to construct the continued fraction solution to a class of nonlinear integral equations which, as special cases, included Fredholm's linear equation and an important non-linear equation which arises in the theory of radiative transfer. GRA

N75-29835# California Univ., Berkeley. Electronics Research Lab.

AN ANALYSIS OF LANCZOS ALGORITHMS FOR SYMMETRIC MATRICES

W. Kahan and B. N. Parlett Sep. 1974 52 p refs

(Contract N00014-69-A-0200-1017)

(AD-A006361; ERL-M467) Avail: NTIS CSCL 12/1

The Lanczos algorithm is presented as a way of generating bases for a sequence of Krylov subspaces. Explicit expressions are given for the departure of the bases from orthogonality. These relations enable one to comprehend the behavior of the algorithm in practice with a minimum of conventional error analysis. In particular this approach sheds light on the central, and difficult problem of ascertaining the right moment to stop the algorithm. Reorthogonalization and block versions are also examined. GRA

N75-29836# Texas Univ., Austin. Center for Cybernetic Studies.

F-CONVEX FUNCTIONS

Aharon Ben-Tal Jan. 1974 44 p refs Prepared in cooperation with Wisconsin Univ., Madison and Technion - Israel Inst. of Tech., Haifa

(Contracts DA-31-124-ARO(D)-462; N00014-67-A-0126-0008; N00014-67-A-0126-0009; Grant NSF GP-38867; NR Proj. 047-021)

(AD-A005900; CCS-190) Avail: NTIS CSCL 12/1

Let F be a family of functions: (R sup n) maps to R. A function: (R sup n) maps to R is called F-convex if it is supported, at each point, by some member of F. For particular choices of F one obtains the convex functions: (R sup n) maps to R and the generalized convex functions in the sense of Beckenbach. F-convex functions are characterized and studied, retaining some essential results of classical convexity. GRA

N75-29837# Naval Weapons Center, China Lake, Calif.

THE MONTE CARLO METHOD OF EVALUATING INTEGRALS

Daniel T. Gillespie Feb. 1975 209 p refs

(AD-A005891; NWC-TP-5714) Avail: NTIS CSCL 12/1

This monograph is a tutorial presentation of the Monte Carlo method of numerically estimating definite integrals. Intended primarily for scientists and engineers, and assuming very little background in probability theory, the monograph attempts to convey a clear understanding of what the Monte Carlo method is, why it works, and how it can be used to evaluate complicated (and often otherwise intractable) multidimensional integrals. General methods are developed for generating sets of random points having prescribed biases; procedures are outlined for using such random points to obtain an estimate of the value of a given integral and the uncertainty associated with this estimate; and techniques are described for reducing the uncertainty without significantly increasing the computation time. GRA

N75-29838# California Univ., Berkeley. Electronics Research Lab.
COMPUTATION OF FUNCTIONS OF TRIANGULAR MATRICES Final Report
B. N. Parlett Nov. 1974 22 p refs
(Contract N00014-69-A-0200-1017)
(AD-A005916; ERL-M481) Avail: NTIS CSCL 12/1

A simple relation exists among the elements of phi(T) when phi is an analytic function and T is triangular. This permits the rapid build up of phi(T) from its diagonal. An analogous relation holds for block triangular matrices. This permits the formation in real arithmetic of real functions of real matrices with complex eigenvalues. The confluent case is included. Algorithms are given some numerical examples. GRA

N75-29839# Indiana Univ., Bloomington.
CONSTRUCTIVE METHODS FOR SOLVING DELTA SUB 4, SUP 2 u + A DELTA SUB 4 u SUB T + C DELTA SUB 4 u + D u EQUALS 0 Interim Report
S. C. Bhatnagar and R. Pertsch Gilbert 1974 19 p refs Prepared in cooperation with Hahn-Meitner-Institut fuer Kernforschung
(Grant AF-AFOSR-2592-74)
(AD-A006261; AFOSR-75-0248TR) Avail: NTIS CSCL 12/1

This paper addresses the application of integral operators for PDE's of mathematical physics. In this paper the construction of integral operators generating solution of classes of pseudoparabolic equations in four space variables is investigated. GRA

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N75-29840# Sheffield Univ. (England). Dept. of Probability and Statistics.
MIXTURES OF INVARIANT NON-ERGODIC PROBABILITIES
M. Bhaskara Rao Jan. 1975 8 p refs
(RR-162/MBR/1) Avail: NTIS HC $3.25

The ergoicity or non-ergodicity property of invariant probability and transition probability mixtures were investigated. Theorems and proofs used in the study are included. Author

N75-29841# Sheffield Univ. (England). Dept. of Probability and Statistics.
THE ASYMPTOTIC BEHAVIOUR OF THE HURST RANGE
P. S. Collings Apr. 1975 12 p refs
(RR-164/PSC/3) Avail: NTIS HC $3.25

Attempts made to explain and prove statements on the Hurst effect are reported. Two statements were proved: The first statement is that the Hurst effect cannot be explained by any process within the Brownian motion domain of attraction. Data show that the n to the 1/2 power law holds for such processes under a mild restriction. In statement two, it was said that if X1, X2,.....Xn are independent with a stable law index alpha > 1, then the expected value of the range is asymptotically proportional to n to the 1/alpha power. However, it was found that in simulations the adjusted, rescaled range varies like n to the 1/2 power. Data show this to be true for any independent identically distributed random variables within the domain of attraction of a stable law with index alpha, 0<alpha>2. Author

N75-29842# Sheffield Univ. (England). Dept. of Probability and Statistics.
SOME REMARKS ON THE CONSTRUCTION OF INDEPENDENT IDENTICALLY DISTRIBUTED RANDOM VARIABLES AND MARKOV CHAINS
D. N. Shanbhag and M. Bhaskara Rao Oct. 1974 4 p
(RR-160/DNS/MBR/2) Avail: NTIS HC $3.25

The impossibility of constructing a sequence of independent identically distributed random variables in a certain framework is dealt with. Observations, theorems, and proofs of this impossibility are given. E.H.W.

N75-29843# Sheffield Univ. (England). Dept. of Probability and Statistics.
LIMIT THEOREMS FOR THE (A,B) PROCESS
P. S. Collings Jun. 1975 10 p refs
(RR-168/PSC/4) Avail: NTIS HC $3.25

Types of arrival processes for queues and input processes for stores used in applied probability are discussed. S sub t is the stock level at time t assuming that one ship-load is taken for processing at each of the scheduled arrival times and that arbitrarily large surpluses or deficits in the shock level can occur without affecting processing. It is shown that if E(b sub i)=0, as a approaches 0, the distribution of aS t converges to a normal limit, but the variance of the limiting distribution is related to the mean deviation and not proportional to the standard deviation. M.J.S.

N75-29844# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A COMPUTER SIMULATION OF RELEASE PARAMETER EFFECTS UPON BOMB IMPACT DISTRIBUTIONS M.S. Thesis
William G. Berry, Jr. and Leo W. Laugginger Jan. 1975 105 p refs
(AD-A006347; SLSR-18-75A) Avail: NTIS CSCL 19/4

This study investigates the validity of an assumption used by the military services in their operational and logistical planning efforts. The assumption is that bomb impacts around a target follow a bivariate normal distribution. The authors formulated a FORTRAN based computer simulation model capable of accurately predicting bomb impacts around a target. The model is also capable of accepting various types of error distributions, or any combination thereof, in bomb release altitude, true airspeed, pitch, and heading. The model then predicts the bomb impact points and their resultant distribution around a target. The adaptability of the model thus enables it to be used in comparing theoretical distributions against actual impact distributions. GRA

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N75-29845*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
LARGE SCALE DYNAMIC SYSTEMS
Washington 1975 206 p refs Proc. of the Utah State Univ.-Ames Res. Center Seminar Workshop on Large-Scale Dyn. Systems, Logan, Utah, 12-16 Aug. 1974
(NASA-SP-371) Avail: NTIS HC $7.25 CSCL 12B

Classes of large scale dynamic systems were discussed in the context of modern control theory. Specific examples discussed were in the technical fields of aeronautics, water resources and electric power. For individual titles, see N75-29846 through N75-29855.

N75-29846* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SIMULATION OF LARGE-SCALE DYNAMIC SYSTEMS
Leonard Roberts *In its* Large-Scale Dyn. Systems 1975 p 7-21 (For availability see N75-29845 20-66)
CSCL 12B

The classes of large-scale dynamic systems are discussed in terms of modeling with emphasis on air transportation system modeling. F.O.S.

N75-29847* Case Western Reserve Univ., Cleveland, Ohio.
HIERARCHICAL MODELS OF VERY LARGE PROBLEMS, DILEMMAS, PROSPECTS, AND AN AGENDA FOR THE FUTURE
John M. Richardson, Jr. *In* NASA. Ames Res. Center Large-Scale Dyn. Systems 1975 p 23-47 refs (For availability see N75-29845 20-66)
CSCL 12B

Interdisciplinary approaches to the modeling of global problems are discussed in terms of multilevel cooperation. A multilevel regionalized model of the Lake Erie Basin is analyzed

along with a multilevel regionalized world modeling project. Other topics discussed include: a stratified model of interacting region in a world system, and the application of the model to the world food crisis in south Asia. Recommended research for future development of integrated models is included. F.O.S.

N75-29848* Harvard Univ., Cambridge, Mass.
AN INFORMAL PAPER ON LARGE-SCALE DYNAMIC SYSTEMS
Y. C. Ho *In* NASA. Ames Res. Center Large-Scale Dyn. Systems 1975 p 49-62 refs (For availability see N75-29845 20-66)
CSCL 12B

Large scale systems are defined as systems requiring more than one decision maker to control the system. Decentralized control and decomposition are discussed for large scale dynamic systems. Information and many-person decision problems are analyzed. F.O.S.

N75-29849* Massachusetts Inst. of Tech., Cambridge.
SURVEY OF DECENTRALIZED CONTROL METHODS
Michael Athans *In* NASA. Ames Res. Center Large-Scale Dyn. Systems 1975 p 101-112 refs (For availability see N75-29845 20-66)
(Grants NGL-22-009-124; AF-AFOSR-2273-72; NSF GK-41647)
CSCL 12B

An overview is presented of the types of problems that are being considered by control theorists in the area of dynamic large scale systems with emphasis on decentralized control strategies. Approaches that deal directly with decentralized decision making for large scale systems are discussed. It is shown that future advances in decentralized system theory are intimately connected with advances in the stochastic control problem with nonclassical information pattern. The basic assumptions and mathematical tools associated with the latter are summarized, and recommendations concerning future research are presented. Author

N75-29850* British Columbia Univ., Vancouver.
ANALYSIS OF LARGE POWER SYSTEMS
Herman W. Dommel *In* NASA. Ames Res. Center Large-Scale Dyn. Systems 1975 p 119-130 refs (For availability see N75-29845 20-66)

Computer-oriented power systems analysis procedures in the electric utilities are surveyed. The growth of electric power systems is discussed along with the solution of sparse network equations, power flow, and stability studies. F.O.S.

N75-29851* IBM Watson Research Center, Yorktown Heights, N.Y.
DECENTRALIZED REGULATION OF DYNAMIC SYSTEMS
Kai-Ching Chu *In* NASA. Ames Res. Center Large-Scale Dyn. Systems 1975 p 131-145 refs (For availability see N75-29845 20-66)
CSCL 12B

A special class of decentralized control problem is discussed in which the objectives of the control agents are to steer the state of the system to desired levels. Each agent is concerned about certain aspects of the state of the entire system. The state and control equations are given for linear time-invariant systems. Stability and coordination, and the optimization of decentralized control are analyzed, and the information structure design is presented. F.O.S.

N75-29852* Santa Clara Univ., Calif.
LARGE-SCALE SYSTEMS: COMPLEXITY, STABILITY, RELIABILITY
D. D. Siljak *In* NASA. Ames Res. Center Large-Scale Dyn. Systems 1975 p 147-162 refs (For availability see N75-29845 20-66)
(Grant NGR-05-017-010)
CSCL 12B

After showing that a complex dynamic system with a competitive structure has highly reliable stability, a class of noncompetitive dynamic systems for which competitive models can be constructed is defined. It is shown that such a construction is possible in the context of the hierarchic stability analysis. The scheme is based on the comparison principle and vector Liapunov functions. F.O.S.

N75-29853* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
DIGITAL SIMULATION OF V/STOL AIRCRAFT FOR AUTOPILOT RESEARCH
L. S. Cicolani and George Meyer *In its* Large-Scale Dyn. Systems 1975 p 163-183 refs (For availability see N75-29845 20-66)
CSCL 12B

Simulations of V/STOL aircraft for autopilot research were introduced as examples of large scale systems. A hierarchy of simulations was assembled, and a modular organization was given to the simulations. The dynamics of the system were subdivided into translational and rotational degrees of freedom, based on the different frequencies at which significant variations in motion variables, control forces and moments occur in two subsystems. This is the basis of the autopilot partitioning into two smaller control problems. Author

N75-29854* Georgia Inst. of Tech., Atlanta.
SOME NOTIONS OF DECENTRALIZATION AND COORDINATION IN LARGE-SCALE DYNAMIC SYSTEMS
C. Y. Chong *In* NASA. Ames Res. Center Large-Scale Dyn. Systems 1975 p 185-194 refs (For availability see N75-29845 20-66)
CSCL 12B

Some notions of decentralization and coordination in the control of large-scale dynamic systems are discussed. Decentralization and coordination have always been important concepts in the study of large systems. Roughly speaking decentralization is the process of dividing a large problem into subproblems so that it can be handled more easily. Coordination is the manipulation of the subproblem so that the original problem is solved. The various types of decentralization and coordination that have been used to control dynamic systems are discussed. The emphasis was to distinguish between on-line and off-line operations to understand the results available by indicating the aspects of the problem which are decentralized. Author

N75-29855* Illinois Univ., Urbana.
SOME ASPECTS OF CONTROL OF A LARGE-SCALE DYNAMIC SYSTEM
Masanao Aoki *In* NASA. Ames Res. Center Large-Scale Dyn. Systems 1975 p 195-202 refs (For availability see N75-29845 20-66)
(Grants AF-AFOSR-1328-67; AF-AFOSR-2319-72)
CSCL 12B

Techniques of predicting and/or controlling the dynamic behavior of large scale systems are discussed in terms of decentralized decision making. Topics discussed include: (1) control of large scale systems by dynamic team with delayed information sharing; (2) dynamic resource allocation problems by a team (hierarchical structure with a coordinator); and (3) some problems related to the construction of a model of reduced dimension. F.O.S.

N75-29856*# Kanner (Leo) Associates, Redwood City, Calif.
ALLOCATION METHODOLOGY. DISTANCE DETERMINATIONS AND POPULATION CATCHMENT DETERMINATIONS, AND THEIR APPLICABILITY TO PRACTICAL PLANNING
A. Roennberg, Owe Salomonsson, and Krister Selander Washington NASA Aug. 1975 65 p refs Transl. into ENGLISH from the Swedish report NIMS-3
(NASA-TT-F-16495; NIMS-3) Avail: NTIS HC $4.25 CSCL 12B

Geographic areas are delimited from given starting points (often some form of service outlet) and retrieval of their contents is carried out for both distance-determined areas and population catchment areas. The applications are carried out with the Flows in Networks analysis system. Author

N75-29857*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A VECTOR-DYADIC DEVELOPMENT OF THE EQUATIONS OF MOTION FOR N-COUPLED FLEXIBLE BODIES AND POINT MASSES

Harold P. Frisch Washington Aug. 1975 62 p refs
(NASA-TN-D-8047; G-7550) HC $4.25 CSCL 12B

The equations of motion for a system of coupled flexible bodies, rigid bodies, point masses, and symmetric wheels were derived. The equations were cast into a partitioned matrix form in which certain partitions became nontrivial when the effects of flexibility were treated. The equations are shown to contract to the coupled rigid body equations or expand to the coupled flexible body equations all within the same basic framework. Furthermore, the coefficient matrix always has the computationally desirable property of symmetry. Making use of the derived equations, a comparison was made between the equations which described a flexible body model and those which described a rigid body model of the same elastic appendage attached to an arbitrary coupled body system. From the comparison, equivalence relations were developed which defined how the two modeling approaches described identical dynamic effects. Author

N75-29858# Naval Postgraduate School, Monterey, Calif.
AN ESTIMATOR FOR AN ANTI-AIRCRAFT GUN FIRE CONTROL SYSTEM M.S. Thesis
John Michael Parr Dec. 1974 151 p refs
(AD-A005763) Avail: NTIS CSCL 19/5

Kalman filtering techniques using a rotated coordinate system were applied to tracking problems encountered in fire control systems. Two models of target motion were considered: a constant-velocity model and a model which assumes correlated random accelerations. Estimators derived from these models were evaluated using Monte-Carlo simulations of constant-velocity and maneuvering targets. An algorithm developed to calculate prediction accuracy data for time intervals based on an approximation of the time of flight for a 5 inch/54 Caliber projectile was used to obtain prediction accuracy statistics for evaluating estimator performance. GRA

N75-29859# Polytechnic Inst. of New York, Brooklyn. Dept. of Electrical Engineering and Electrophysics.
APPROXIMATION OF COMPLEX AEROSPACE SYSTEMS BY SIMPLER ONES Final Report
R. F. Drenick Jan. 1975 35 p refs
(Grant AF-AFOSR-2389-72; AF Proj. 9749)
(AD-A006466; AFOSR-75-0315TR) Avail: NTIS CSCL 12/1

The objective of the project was the development of an approximation method, theory as well as computational procedures, which would make the simulation and analysis of complex linear systems less time-consuming and more economical for Air Force laboratories and their contractors. The theory of such a method was in fact developed, but computational procedures remain to be completed. GRA

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

No abstracts in this category.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N75-29860 British Library Lending Div., Boston Spa (England).
LAGRANGIAN DESCRIPTION OF STEADY WAVES
A. S. Monin [1974] 4 p Transl. into ENGLISH from Dokl. Akad. Nauk (Moscow), 1972 p 769-771
(BLL-M-23564-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.: 1 BLL photocopy coupon

Steady wave propagation in an ideal incompressible heavy liquid with a free surface and constant velocity, as described by Lagrangian coordinates, was discussed. Author

N75-29861# Istituto Superiore di Sanita, Rome (Italy). Lab. di Fisica.
HIGH-ENERGY BEAMS AND MAGNETIC SPECTROMETERS
G. Matthiae 20 Aug. 1974 57 p refs In ITALIAN; ENGLISH summary
(ISS-L-74/8) Avail: NTIS HC $4.25

The properties of dipole and quadrupole magnets are discussed together with their combined use in the beam transport systems. Commonly used methods of magnetic analysis are reviewed. Several examples of charged particle spectrometers are discussed. Author

N75-29862# Research Inst. of National Defence, Stockholm (Sweden).
AN INVESTIGATION OF ELECTROMAGNETIC WAVE SCATTERING FROM ROUGH SURFACES, BASED ON A COMPARISON BETWEEN VECTORIAL AND SCALAR KIRCHHOFF METHODS
Staffan Hoeijer Feb. 1975 34 p refs
(FOA-B-20002-E1; ISBN-97-7056-031-5) Avail: NTIS HC $3.75

The Kirchhoff method is of great value when calculating electromagnetic wave scattering from rough surfaces. In this report a thorough investigation is made of the scattered field expressions obtained with this method when the complete vector theory is used. The results make it possible to investigate the possibilities and limitations of the simpler scalar formulation. Complete expressions for the first and second order moments of the space time varying fields are given. Then successive approximations are introduced, and the results are compared with those of Beckmann and Spizzichino. Finally, the scattering of plane waves (monochromatic and nonmonochromatic) from a two dimensionally very rough surface is treated in some detail. Author

N75-29863# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
EXPERIMENTS OF NONEQUILIBRIUM, NONSTATIONARY EXPANSION OF WATER VAPOUR/CARRIER GAS MIXTURE IN A SHOCK TUBE
S. P. Kalra Apr. 1975 43 p refs Sponsored in part by Atomic Energy of Canada Ltd.
(Grant AF-AFOSR-2274-72)
(UTIAS-195) Avail: NTIS HC $3.75

The investigation of condensation process in a nonstationary nonequilibrium expansion of water vapor/carrier gas (ultra pure N2) mixture is presented. The density variations, pressure variations, and onset of condensation due to such expansion, are monitored at fixed locations in the driver section of the shock tube by using a laser Fabry-Perot interferometer, a differential interferometer, and piezotrons transducer devices. The effect of the cooling rate on the supersaturation at onset of condensation and its delay time (nonequilibrium zone) is determined. An empirical relation is derived between the supercooling and the rate of cooling at onset of condensation. A theoretical analysis is performed using this empirical relation in order to determine the location of the onset of condensation in such expansions. It is shown that the location of the onset is uniquely determined for a given initial driver condition, e.g., (1) relative humidity; (2) vapor mass fraction; and (3) temperature. A parametric study, using these parameters is also given. The experimental findings are in agreement with the theoretical prediction of onset. Author

N75-29864# Oxford Univ. (England). Dept. of Engineering Science.
INTER-PARTICLE PERCOLATION. PART 1: DEMONSTRATION OF THE PHENOMENON AND EQUIPMENT DEVELOPMENT
A. M. Scott Oct. 1974 112 p refs Sponsored jointly by Sci. Res. Council and Esso Develop. Company Ltd.
(OUEL-1102/74-Pt-1) Avail: NTIS HC $5.25

When cohesionless solid particles of different types are mixed, the components are frequently not evenly distributed after prolonged mixing and the distribution of components changes often upon handling the mixture. A microscopic process, known as inter-particle percolation, believed to be the drainage of small particles through the interstices between larger particles was

studied. Particle mobility produced by shear straining was observed in a strain apparatus. The rate at which small particles moved down was detected at top and bottom surfaces, demonstrating the phenomenon. A model relating diffusive bulk particle movements, relative particle size, and percolation rates was proposed and tested. ESRO

N75-29865# Oxford Univ. (England). Dept. of Engineering Science.
INTER-PARTICLE PERCOLATION. PART 2: RESULTS AND DISCUSSION
A. M. Scott Oct. 1974 167 p refs Sponsored jointly by Sci. Res. Council and Esso Develop. Company Ltd.
(OUEL-1103/74-Pt-2) Avail: NTIS HC $6.25

Conditions similar to those expected in a failure zone in a strained granular material were produced in a simple shear apparatus and strain-induced inter-particle percolation was demonstrated. The top and bottom surfaces were observed to determine the rate at which smaller particles moved downwards. The distance which a small particle moved per unit of strain depended on the relative size of the particles. A physical model of percolation was proposed and a mathematical model to account for the dependence of percolation rate on diameter ratio was given. Author (ESRO)

N75-29866# Mission Research Corp., Santa Barbara, Calif.
LOW FLUENCE CALCULATION OF PHOTOELECTRON FLUX DENSITIES OUTSIDE AN EMITTING SPHERE
Roger Stettner 13 Dec. 1974 26 p refs
(Contracts DNA001-74-C-0032; DNA001-73-C-0118; DNA Proj. NWED-QAXE)
(AD-A005825; MRC-N-110; DNA-3411T) Avail: NTIS CSCL 20/3

A method for calculating the flux of photoelectrons emerging from a surface, in a force-free environment, is described. The flux is constructed from the energy and angular distribution of the electrons at the surface and represents a particular solution to a class of time dependent solutions of the collisionless force-free Boltzman equation. Detailed calculations are made for a sphere emitting photoelectrons over half its surface due to the passage of a plane X-ray of finite time duration. GRA

N75-29867# Cornell Univ., Ithaca, N.Y. Sibley School of Mechanical and Aerospace Engineering.
MAGNETIC FLUIDS: MAGNETIC FORCES AND PUMPING MECHANISMS Final Report
Constance W. Miller Sep. 1973 115 p refs
(Contract N00014-67-A-0077-0011)
(AD-A006323) Avail: NTIS CSCL 07/4

Ferromagnetic fluids are a colloidal suspension of subdomain iron particles dispersed in a carrier fluid. The force exerted on the fluid by a magnetic field and the subsequent pressure exerted by the fluid cannot be explained by a continuum theory. Starting from the force on a dipole, continuum theory (using an average magnetization, M) of the fluid, predicts the pressure jump at the fluid surface. To test the theory, pressure measurements were made. The fluid was contained in a glass sphere or cylinder with tubes attached to the container at different points. The pressure necessary to force the fluid back to the container shape was measured using a differential manometer. Pressure measurements were made for the fluid in a uniform magnetic field and in a varying magnetic field. Using the fluid in a pumping scheme was also considered. Author

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N75-29868+ Engineering Sciences Data Unit, London (England).
NORMAL INCIDENCE ABSORPTION COEFFICIENTS AND ACOUSTIC IMPEDANCES OF SINGLE LAYER PERFORATED SHEET LINERS
Jun. 1973 15 p refs Sponsored in part by Ministry of Defense (Procurement Executive) and the Roy. Aeron. Soc.
(ESDU-74004) Copyright. Avail: NTIS HC $74.50

A method is described for estimating the sound absorption characteristics of cavity-baked perforated sheet duct liner for predicting noise attenuator characteristics of aircraft gas turbine propulsion ducts. The data are applicable to noise environments up to 160 db with negligible airflow at sea-level temperatures and pressures. Author

N75-29869# Compass Systems, Inc., San Diego, Calif.
A RAY TRACE PROGRAM FOR THE CDC 1604 COMPUTER Final Report
Baldwin Vanderbijl Sep. 1974 37 p
(Contract N62271-73-M-1022)
(AD-A005321; Rept-156; EPRF-CP-Note-18) Avail: NTIS CSCL 20/1

The report describes a package of programs for practical use of an existing oceanic acoustic ray program (RAYTRACE) The RAYTRACE program is also presented with appropriate CDC 1604 computer operation procedures. Several of the programs in the package are presented to provide a method for developing the input data to the RAYTRACE program in required format. The last program in the package (PLOTRAY) provides a means of visual display of the acoustic ray via CALCOMP graphics. GRA

N75-29870# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
MICROWAVE ACOUSTICS HANDBOOK. VOLUME 2: SURFACE WAVE VELOCITIES, NUMERICAL DATA Physical Sciences Research Papers
A. J. Slobodnik, Jr., R. T. Delmonico, and E. D. Conway 25 Oct. 1974 354 p
(AF Proj. 5573)
(AD-A006113; AFCRL-PSRP-609; AFCRL-TR-74-0536) Avail: NTIS CSCL 09/1

Information essential for the accurate design of advanced acoustic surface wave filters, signal processors, and other miniature low-cost reliable devices for use in communications and electronic sensing is given. Numerical data on surface wave velocity, electromechanical power flow angle, mechanical displacement, electric potential, and estimates of surface wave coupling to interdigital transducers are given for various orientations of the following surface wave substrate materials: $Ba_2NaNb_5O_{15}$, $Bi_{12}GeO_{20}$, CdS, Diamond, $Eu_3Fe_5O_{15}$, Gadolinium Gallium Garnet, GaAs, Germanium, InSb, InAs, PbS, $LiNbO_3$, MgO, Quartz, Rutile, Sapphire, Silicon, Spinel, TeO_2, YAG, YGaG, YIG, and ZnO. This present volume is intended to be used as a supplement to Volume 1A whenever accurate numerical data is required rather than the more convenient graphical information. GRA

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N75-29871# Tokyo Univ. (Japan).
THE ELECTRON ENERGY LOSS RATES BY POLAR MOLECULES
Osamu Ashihara Jun. 1975 19 p refs Repr. from Inst. of Space and Aeron. Sci., Univ. of Tokyo, Rept. 530 (Tokyo), v. 40, no. 10, Jun. 1975 p 257-275
(ISAS-530-Vol-40-No-10) Avail: NTIS HC $3.25

Simple useful formulae are derived for rates of electron energy loss through the rotational and vibrational excitation of polar molecules. Accuracy of these formulae is tested by comparing rates from the formulae with results of direct numerical calculations from the relevant cross sections on some molecules abundant in the cometary atmospheres. The energy loss rates, as functions of the difference between electron and gas temperatures, are presented in graphical forms for H_2O, OH, CO, CH, NH, NH_3, and also for H_2 and O for the gas temperatures: 300K, 500K and 1000K. Author

N75-29872# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATIONS ON THE BEHAVIOR OF EXCITED METHYLFLUORIDE MOLECULES IN PROXIMITY OF ATOMS [UNTERSUCHUNGEN ZUM VERHALTEN SCHWINGUNG-SANGEREGTER METHYLFLUORIDMOLEKUELE IN GEGENWART VON ATOMEN]
D. Arnoldi, M. Kneba, H. G. Wagner, and J. Wolfrum Aug. 1974 46 p refs In GERMAN
(Rept-8/1974) Avail: NTIS HC $3.75; Max-Planck-Inst. fuer Stroemungsforsch., Goettingen, West Ger. 12,90 DM

Definite excited states of the electronic ground states of molecules in proximity of free atoms were obtained with CO2 lasers at atmospheric pressure. Vibrational-rotational transitions from 9.1 mu m to 11.0 mu m were singled out with a reflection grid. The behavior of the excited molecules was followed up with infrared fluorescence, and variations in atomic concentration were directly observed by chemiluminescence reactions. The behavior of excited methyl fluoride in proximity of H, D, O was observed. Only O produced a quenching of the observed excited state. ESRO

N75-29873# Harry Diamond Labs., Washington, D.C.
ANALYSIS OF THE GROUND TERM ENERGY LEVELS FOR TRIPLY IONIZED NEODYMIUM IN YTTRIUM ORTHOVANADATE
Donald E. Wortman, Nick Karayianis, and Clyde A. Morrison Dec. 1974 19 p refs
(DA Proj. 1T-161102-A-34A; HDL Proj. 370432)
(AD-A006017; HDL-TR-1685) Avail: NTIS CSCL 07/4

An investigation has been made of the quartet I ground term of Nd(3+) in YVO4. Wavelength and polarization measurements of the absorption in the wavelength range from 0.8 to 2.6 micrometers were used to establish energy levels for the quartet F(3/2), quartet I(9/2), quartet I(13/2), and quartet I(15/2) multiplets. These data were correlated with reported spectra in the literature, and an energy level scheme was obtained that identifies 25 out of the 26 ground term levels. Theoretical (g(parallel) and g(perpendicular) values) are in good agreement with Ranon's reported values for the ground state; thus, the ground state symmetry property was determined to be Gamma (7,8) in S(4) notation or Gamma (7) in D(2a). GRA

N75-29874# Army Foreign Science and Technology Center, Charlottesville, Va.
SOLUTION OF PROBLEMS IN PHYSICAL AND CHEMICAL KINETICS BY THE MONTE CARLO METHOD
S. A. Denisik 17 Mar. 1973 51 p refs Transl. into ENGLISH from Primenenie Vychislitelnoi Matematiki k Khimii, Fiziki i Kinetike (USSR)
(AD-A006083; FSTC-HT-23-1052-73) Avail: NTIS CSCL 07/4

Contents: Mathematical bases for application of Monte Carlo method to kinetic problems; Maxwellization of mixture of two gases with different initial temperatures; Maxwellization of two counter-currents of a gas; kinetics of high-temperature dissociation of molecules (using examples of dissociation of methane and tetrachlorosilane); breakdown of Maxwell-Boltzmann distribution of molecules by fast chemical reactions and the effect of the resulting distribution on the reaction rate; oscillatory relaxation and dissociation of anharmonic oscillators at high temperatures-comparative study of models of single-quantum and multi-quantum progressively oscillatory transitions. GRA

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N75-29875# Notre Dame Univ., Ind. Dept. of Physics.
NUCLEAR STRUCTURE RESEARCH Annual Report, 1 Jan. - 31 Dec. 1974
Jul. 1975 236 p refs
(Grants NSF GP-27456; PS-207320G)
Avail: NTIS HC $7.50

Research in the area of nuclear structure is reviewed. Topics discussed include studies using polarized beams, stripping to unbound states, spectroscopy in the sd and fp shells, energy measurements, spectroscopy in the rare earth region, heavy-ion charged particle measurements, and equipment development. For individual titles, see N75-29876 through N75-29880.

N75-29876 Notre Dame Univ., Ind.
EXPERIMENTS
In its Nucl. Struct. Res. Jul. 1975 p 5-26 refs (For availability see N75-29875 20-73)

Investigations were conducted on (d vector, p) and (d vector, t) reactions in some light nuclei (beryllium and carbon), spectroscopic analysis of intermediate weight nuclei (d vector, p) and (d vector, t) reactions, and proton elastic scattering studies on O-16, O-18, and N-14. Results are presented and discussed. M.J.S.

N75-29877 Notre Dame Univ., Ind.
STRIPPING TO UNBOUND STATES
In its Nucl. Struct. Res. Jul. 1975 p 27-39 refs (For availability see N75-29875 20-73)

Previous work in neutron stripping to unbound states is reviewed, and experiments conducted on targets of Be-9, C-14, and O-16 are discussed. Stripping to unbound state in C-15 was investigated along with the level schemes of nuclei in the f sub 7/2 shell. M.J.S.

N75-29878 Notre Dame Univ., Ind.
SPECTROSCOPY IN THE sd AND fp SHELLS
In its Nucl. Struct. Res. Jul. 1975 p 41-64 refs (For availability see N75-29875 20-73)

Experiments conducted on the widths of low-lying states in N-13 and the question of reaction dependence are discussed. Measurements of the tensor analyzing power were carried out for the Ni-58(d,p)Ni-59 and Ni-60(d,p)Ni-61 reactions, and energy levels of K-38 were studied. Other topics discussed include lifetimes of excited levels in Co-55, gamma ray energies, low-lying levels of Mn-57, and investigation in gamma-ray spectroscopy. M.J.S.

N75-29879 Notre Dame Univ., Ind.
ENERGY MEASUREMENTS
In its Nucl. Struct. Res. Jul. 1975 p 65-121 refs (For availability see N75-29875 20-73)

Research in the area of energy measurements is reviewed. Topics discussed include: systematic study of excitation energies in cobalt isotopes; level structure measurements with the (p, alpha)(He-3,d) and (He-3, d gamma) reaction and energy levels in Mn-51 and Mn-53; states in Kr-85 from the (d,p) and (d vector,p) reactions; charged particle Q values; measurement of the C-12+p resonance at 14.2 MeV; absolute excitation energy measurements using an electrostatic analyzer, remeasurement of C-12 second excited state, resonance fluorescence of S-32, and excitation energies in Yb isotopes. M.J.S.

N75-29880 Notre Dame Univ., Ind.
SPECTROSCOPY IN THE RARE EARTH REGION
In its Nucl. Struct. Res. Jul. 1975 p 122-152 refs (For availability see N75-29875 20-73)

Research in the gamma ray spectroscopy of rare earth nuclei is reviewed. Subjects discussed include: (alpha, xn gamma) studies on rare earth nuclei; gamma-vibrational bands and other levels in Er-162, Er-164, and Er-166 populated by the (alpha, 2n gamma) reactions; states in Sm-150 and Sm-152; Coulomb excitation studies; the use of Li-7 beams as a spectroscopic tool; the decay of Tb-156m; and the (d,t) and (d,p) reactions on rare-earth nuclei. M.J.S.

N75-29881# Instituto Nacional de Tecnica Aeroespacial, Madrid (Spain).
DISPERSION RELATION FOR ELECTRON WAVES PROPAGATING IN AN ISOTROPIC PLASMA CONTAINING MAXWELLIAN AND SUPRATHERMAL ELECTRONS
Juan R. Sanmartin [1973] 28 p refs
Avail: NTIS HC $3.75

The dispersion relation for longitudinal electron waves propagating in a collisionless, homogeneous, isotropic plasma containing both Maxwellian and suprathermal electrons is discussed. The dispersion curve, having two separate branches for zero suprathermal energy spread, is found to depend sensitively on this quantity. At increasing values of the energy half-width of the suprathermal population, the branches approach each other until they touch at a connection point, for a small, critical value of that half-width. The topology of the dispersion curves is different for half-widths above and below the critical value and this affects the use of wave propagation measurements as a diagnostic technique for the determination of the electron distribution function. Author (ESRO)

N75-29882# Nuclear Regulatory Commission, Washington, D.C.
SAFETY EVALUATION OF THE WASHINGTON PUBLIC POWER SUPPLY SYSTEM, NUCLEAR PROJECTS 1 AND 4. DOCKETS 50-460 AND 50-513
May 1975 284 p refs
(PB-241266/6; NUREG-75/036) Avail: NTIS HC $8.75 CSCL 18E

The evaluation consists of a technical review and staff evaluation of applicant information on: (1) population density, land use, and physical characteristics of the site area; (2) design, fabrication, construction, testing criteria, and performance characteristics of the plant structures, systems, and components important to safety; (3) expected response of the facility to various anticipated operating transients and to a broad spectrum of postulated design basis accidents; (4) applicant engineering, construction and quality assurance organizations, and his plans for the conduct of plant operations; (5) design criteria for systems to control the plant's radiological effluents; and (6) proposed R and D program for plant design features needing further work. The staff concluded that the proposed facility would not be inimical to the health and safety of the public provided that the outstanding matters discussed in the report are favorably resolved. GRA

N75-29883# Nuclear Regulatory Commission, Washington, D.C.
SAFETY EVALUATION REPORT OF JOSEPH M. FARELY NUCLEAR PLANT, UNITS 1 AND 2
2 May 1975 168 p refs
(PB-241108/0; NUREG-75/034) Avail: NTIS HC $6.25 CSCL 18E

A safety evaluation of the plants, located in Houston County, Alabama, consists of a technical review and staff evaluation of applicant information on: (1) population density, land use, and physical characteristics of the site area; (2) design, fabrication, construction, testing criteria, and performance characteristics of plant structures, systems, and components important to safety; (3) expected response of the facility to anticipated operating transients, and to postulated design basis accidents; (4) applicant engineering and construction organization, and plans for the conduct of plant operations; and (5) design criteria for a system to control the plant's radiological effluents. The staff concluded that the plant can be operated by the Alabama Power Company without endangering the health and safety of the public provided that the outstanding matters discussed in the report are favorably resolved. GRA

N75-29884# Nuclear Regulatory Commission, Washington, D.C.
SAFETY EVALUATION OF THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION'S LOSS OF FLUID TEST FACILITY. PROJECT NO. 394
May 1975 111 p
(PB-241456/3; NUREG-75/037) Avail: NTIS HC $5.25 CSCL 18E

A safety evaluation of the Energy Research and Development Administration's (ERDA) Loss of Fluid Test (LOFT) facility, located at the Idaho National Engineering Laboratory, Idaho Falls, Idaho, was prepared. The evaluation, prepared to provide ERDA with advice on the safe operation of the LOFT facility, concludes that public health and safety will not be endangered by the operation of the LOFT facility. GRA

N75-29885# Wisconsin Univ., Stoughton. Physical Sciences Lab.
OPERATION OF THE SYNCHROTRON RADIATION CENTER OF THE UNIVERSITY OF WISCONSIN Final Report, 1969 - 1974
Ednor M. Rowe 1975 65 p
(Contract F44620-70-C-0029; AF Proj. 9763)
(AD-A005784; AFOSR-75-0304TR) Avail: NTIS CSCL 20/7

The operation of a 240 MeV electron storage ring as an intense source of synchrotron radiation for a wide variety of investigations in the far ultraviolet and soft X-ray region of the electromagnetic spectrum has been supported by the Air Force Office of Scientific Research through the years 1969-1974. During this period, the performance of the storage ring has been improved and a research facility of international renown has been developed around it. As part of the program that was carried out to bring the storage ring and the research facility that it serves to its present state, a number of optical instruments of advanced design and performance have been developed with the support of the operations contract. Researches in the orbit dynamics of the circulating electrons in the storage ring have been carried out and the results of these studies applied to the storage ring to bring about a large increase in stored beam current and beam lifetime. A 44 MeV electron accelerator of the microtron type was designed and built to replace the original storage ring injector which has resulted in improved reliability in the operation of the storage ring and a reduction in operating costs and power demand. GRA

N75-29886# Aerodyne Research, Inc., Burlington, Mass.
EXPERIMENTAL STUDIES OF THE COLLISIONAL EXCITATION OF INFRARED ACTIVE VIBRATIONAL STRETCH MODES IN CO2 AND H2O WITH AN INTERSECTING, HYPERTHERMAL MOLECULAR BEAM APPARATUS, VOLUME 1 Final Report
C. E. Kolb, M. Camac, R. B. Subbarao, J. B. Anderson, and J. B. Fenn Feb. 1975 48 p refs Prepared in cooperation with Yale Univ.
(Contract F04611-73-C-0050; AF Proj. 5730)
(AD-A006237; ARI-RR-55; AFRPL-TR-75-2) Avail: NTIS CSCL 07/4

An intersecting, hyperthermal energy molecular beam apparatus with a liquid nitrogen cooled infrared radiation detector system designed to measure T-V collisional excitation cross sections for the infrared active modes of small molecules is described in this report. In addition, a novel infrared calibration technique using the self-emission of a molecular beam containing H2O or CO2 formed by supersonic expansion from a high temperature nozzle is presented and the design and testing of a dc arc heated supersonic nozzle source for producing molecular beams of atomic oxygen seeded in noble gases is discussed. Measured upper bounds for T-V excitation of the CO2 and H2O nu 3 vibrational modes in collision with N2 at several relative collision velocities in the range of 4 to 8 km/second are presented and compared to literature values for total scattering cross sections of CO2 and H2O as well as to previous experimental and theoretical determinations of CO2 and H2O nu 3 activation cross sections. GRA

74 OPTICS

Includes light phenomena.

N75-29887*# Westinghouse Defense and Electronic Systems Center, Baltimore, Md. Systems Development Div.
BREADBOARD LINEAR ARRAY SCAN IMAGER PROGRAM Final Report
25 Apr. 1975 150 p
(Contract NAS5-21806)
(NASA-CR-143828) Avail: NTIS HC $5.75 CSCL 20F

The performance was evaluated of large scale integration photodiode arrays in a linear array scan imaging system breadboard for application to multispectral remote sensing of the earth's resources. Objectives, approach, implementation, and test results of the program are presented. Author

N75-29888# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
IRRADIANCE SCINTILLATIONS: COMPARISON OF

THEORY WITH EXPERIMENT Physical Sciences Research Papers.
Ronald L. Fante 20 Dec. 1974 12 p refs
(AD-A006365; AFCRL-PSRP-619; AFCRL-TR-74-0626) Avail: NTIS CSCL 20/6

Calculations are made using a new theory for the covariance of the irradiance scintillations of an optical wave in a turbulent medium. These are compared with recent experimental data and found to be in good agreement. GRA

N75-29889# Army Foreign Science and Technology Center, Charlottesville, Va.
RADIATION SCATTERING BY ATMOSPHERIC AEROSOLS
L. S.. Ivlev and E. L. Yanchenko 27 Aug. 1974 10 p refs Transl. into ENGLISH from Probl. Fiz. Atmosfery (USSR), no. 10, 1972 p 128-132
(AD-A006081; FSTC-HT-23-707-74) Avail: NTIS CSCL 20/6

The authors study atmospheric aerosols by the back scattering method and show that they can be studied without a knowledge of their distribution on the basis of spectral observations. The authors propose the use of satellites for observation of the back-scattered solar radiation. GRA

N75-29890# Hughes Research Labs., Malibu, Calif.
COAT MEASUREMENTS AND ANALYSIS Quarterly Technical Report, 2 Jul. - 1 Oct. 1974
J. E. Pearson Feb. 1975 48 p refs
(Contract F30602-75-C-0001)
(AD-A006105; RADC-TR-75-47; QTR-1) Avail: NTIS CSCL 20/6

Coherent Optical Adaptive Techniques (COAT) offer promise in overcoming beam distortions experienced by high power optical beams propagating in a turbulent absorbing atmosphere. This report describes the first phase of a program to evaluate the effectiveness of multidither COAT in eliminating thermal blooming distortions. An absorbing gas cell, wind generation mechanism, and gas handling station have been constructed for use in visible wavelength laboratory experiments. An optical system has been designed and built which will produce beam parameters and blooming levels which can be scaled to interesting scenarios at 10.6 micrometers. Preliminary measurements of blooming compensation using an 18-element, 0.488 micrometers COAT system have been made with a thin static, liquid-filled cell as the blooming medium. The COAT system increased the target irradiance by more than a factor of 10 and reduced the beamwidth by a factor of 5.4 from the uncorrected bloomed case. GRA

N75-29891# Hughes Research Labs., Malibu, Calif.
THE PERFORMANCE OF EDGE OPERATORS ON IMAGES WITH TEXTURE
Bruce Bullock Oct. 1974 45 p refs
(Contract F44620-74-C-0054; AF Proj. 9769)
(AD-A006230; AFOSR-75-0178TR) Avail: NTIS CSCL 09/2

This report evaluates the performance of several edge operators on real world images with texture. Two types of edge detection are shown to be important for the analysis of real world scenes. First is the detection of major surface boundaries (called macro edges), and second is the detection of the surface texture element boundaries (called microstructure edges). Six edge operators are then evaluated to determine their performance at both macro and microstructure edge detection. The image data set for the evaluation consists of one 'blocks world' image and five difficult real world scenes. The Hueckel operator is shown to be the most thorough and sensitive to low contrast edges, and the Kirsch operator is shown to be the best for fast, conservative, first evaluation. A distinction is made between sparse and dense microstructure to explain the apparent low contrast in low resolution microstructure. Finally, a strategy using goal-guided search and planning is mentioned as a way to take efficient advantage of the best properties of both the Hueckel and Kirsch operators. GRA

N75-29892# Arizona Univ., Tucson. Optical Sciences Center.
LARGE DIAMETER ACTIVE MIRROR WITH HOLOGRAPHIC FIGURE SENSING Final Report, 15 Jun. 1973 - 15 Jun. 1974
Oct. 1974 111 p
(Contract F04701-73-C-0309)
(AD-A006211; SAMSO-TR-75-17) Avail: NTIS CSCL 20/6

The research was directed toward realization of some of the concepts involved in fabrication and control of future large thin mirror active optical systems. Two principal topics were investigated. One was the mechanization of a new technique for an integrated optical surface and structural assembly for large precision mirrors. The other consisted of studies toward the addition of holographic grating imaging components directly to the surface of these mirrors for use in obtaining control signals. GRA

N75-29893# Army Foreign Science and Technology Center, Charlottesville, Va.
LIGHT ABSORPTION IN SUSPENSIONS OF LARGE SOFT PARTICLES OF ARBITRARY SHAPE
F. Ya. Sidko, I. A. Menchenko, N. S. Yeroshin, and V. A. Zakharova 2 Sep. 1974 9 p refs Transl. into ENGLISH from Rasseyanie Sveta v Zemnoi Atmosfere, Alma Ata, (USSR), 1972 p 104-109
(AD-A005970; FSTC-HT-23-0386-74) Avail: NTIS CSCL 20/6

The article proposes a method for determining the light absorption by arbitrary particle suspensions with relative refractive indices close to unity. The relation between the absorption capabilities of the particles, their suspensions and the optical thickness of the particles, their relative volume in the suspension and their size distribution is defined. GRA

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N75-29894*# Old Dominion Univ. Research Foundation, Norfolk, Va. Dept. of Physics and Geophysical Sciences.
COMPUTER SIMULATION OF PLASMA AND N-BODY PROBLEMS Annual Report, Jun. 1974 - May 1975
Wynford L. Harries and John B. Miller Aug. 1975 222 p ref (Grant NsG-1040)
(NASA-CR-143286) Avail: NTIS HC $7.25 CSCL 20I

The following FORTRAN language computer codes are presented: (1) efficient two- and three-dimensional central force potential solvers; (2) a three-dimensional simulator of an isolated galaxy which incorporates the potential solver; (3) a two-dimensional particle-in-cell simulator of the Jeans instability in an infinite self-gravitating compressible gas; and (4) a two-dimensional particle-in-cell simulator of a rotating self-gravitating compressible gaseous system of which rectangular coordinate and superior polar coordinate versions were written. Author

N75-29895*# Scientific Translation Service, Santa Barbara, Calif.
PLASMA ON EARTH AND IN SPACE
V. N. Orayevskiy Washington NASA Aug. 1975 190 p refs Transl. into ENGLISH of the book "Plazma na Zemle i v Kosmose" Kiev, Naukova Dumka Press p 1-170
(Contract NASw-2483)
(NASA-TT-F-16373) Avail: NTIS HC $7.00 CSCL 20I

Problems of controlled thermonuclear reactions and of magnetohydro- and gas-dynamics are discussed. The origin and structure of the earth's magnetic field, magnetic storms and aurora are considered. Contemporary ideas about young, old, and dying stars are discussed. New data about cosmic sources of radio and infrared radiation, as well as radio galaxies, quasars and pulsars are presented. Author

N75-29896*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ELECTRICAL CHARACTERISTICS OF A FREE-BURNING DIRECT-CURRENT ARGON ARC OPERATING BETWEEN 90 AND 563 KILOWATTS WITH TWO TYPES OF CATHODES
Henry B. Curtis and Arthur J. Decker Washington Aug. 1975 21 p refs

(NASA-TN-D-8032; E-8316) Avail: NTIS HC $3.25 CSCL 20I

The electrical characteristics of a high-power, long-lived, free-burning dc argon arc are presented. Empirical formulas relating voltage to current, electrode separation, and operating pressure are given for two types of cathodes: a typical point tip cathode and a cathode with a 1.27-cm-(0.5-in.-) diameter crater in the tip. Power was varied from 90 to 563 kW. A discussion of the cathode with the crater tip is given. Author

N75-29897# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
AN EXTERNAL RING SYSTEM FOR MAGNETIC PLASMA CONFINEMENT
B. Lehnert Feb. 1974 16 p
(TRITA-EPP-74-08) Avail: NTIS HC $3.25

A scheme for steady-state magnetic plasma confinement is suggested which consists of a superposition of two poloidal magnetic field components. The first arises from the unidirectional currents flowing in a number of ring-shaped external conductors. The second is produced by an oppositely directed azimuthal current in the plasma. An additional toroidal magnetic field component may be introduced. It is indicated that this scheme provides a closed axisymmetric magnetic bottle with closed guiding-center drift orbits of the plasma particles, as well as possibilities of bootstrap operation. Discussions are presented on the possibilities of stabilizing electrostatic modes by means of minimum-average-B geometry and of stabilizing electromagnetic modes by means of the mutual forces between the currents in the plasma and those in the external conductors. This scheme differs from those having passive conductors surrounding the plasma in that given currents are fed into the rings from external sources.
Author (ESRO)

N75-29898# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
EXPERIMENTS ON MAGNETOACOUSTIC RESONANCES IN A ROTATING PLASMA
E. Tennfors, J. Bergstroem, and M. Bures Dec. 1974 31 p refs Sponsored jointly by Swed. Atomic Res. Council and Bank of Swed. Tercentenary Fund
(TRITA-EPP-74-24) Avail: NTIS HC $3.75

An external ringing resonance circuit was coupled to a rotating fully ionized hydrogen plasma. The damping of the oscillations was a measure of the coupling between the external circuit and the plasma. The frequency of the oscillations was varied and absorption spectra were obtained for some different coupling coil structures. Absorption peaks were identified with various magnetoacoustic modes. The dependence of the coil structure was observed. In the high frequency end of the variation interval for the external circuit a strong resonance seemed to appear. This may be related to the ion cyclotron frequency, but the present external circuit worked poorly in this region.
Author (ESRO)

N75-29899# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
STABILIZATION OF KINK DISTURBANCES BY INHOMOGENEOUS MAGNETIC FIELDS
T. Hellsten Jan. 1975 27 p refs
(TRITA-EPP-75-01) Avail: NTIS HC $3.75

Investigations were carried out for a pinched plasma column placed in the octupole field generated by four external parallel current-carrying straight conductors. The inhomogeneous magnetic vacuum field stabilized the disturbances, on account of the inductive field changes. This stabilizing effect increased rapidly as the conductor positions were made to approach the plasma boundary. The analysis was performed both in absence and in presence of an axial magnetic field. Author (ESRO)

N75-29900# California Univ., Los Angeles. Plasma Physics Group.
A LARGE QUIESCENT MAGNETIZED PLASMA FOR WAVE STUDIES
W. Gekelman and R. L. Stenzel Dec. 1974 42 p refs
(Grant AF-AFOSR-2332-72; AF Proj. 9751)
(AD-A006461; AFOSR-74-0407TR; PPG-194) Avail: NTIS CSCL 20/9

The development of a large magnetized plasma for wave propagation experiments is described. The method employs a dc discharge in a weak magnetic field region and subsequent particle diffusion into a strong uniform B-field region. Plasma diagnostics with probes, microwaves and spectroscopy for steady state and afterglow are described. Examples of wave propagation for ion acoustic waves, electron Bernstein waves and lower hybrid waves indicate the versatibility of the device. GRA

N75-29901# California Univ., Los Angeles. Dept. of Physics.
PARAMETRIC INSTABILITY OF THE SHEATH PLASMA RESONANCE Interim Report
R. Stenzel, H. C. Kim, and A. Y. Wong Feb. 1975 17 p refs
(Grant AF-AFOSR-2332-72; AF Proj. 9751)
(AD-A006489; AFOSR-75-0378TR) Avail: NTIS CSCL 20/9

A large amplitude rf pump signal was applied to a wire antenna in a magnetic field free plasma. When the pump frequency omega sub o corresponds to twice the sheath-plasma resonance frequency omega sub r, and the pump amplitude exceeds a threshold value, spontaneous excitation of the signal at omega sub r = omega sub 0/2 is observed. The process is explained as a periodic variation of the sheath thickness causing the sheath-plasma resonance to become parametrically unstable. The rf field pressure can induce density relaxation oscillations near the ion plasma frequency which are observed to modulate the instability spectrum strongly. Author

N75-29902# Naval Research Lab., Washington, D.C.
CALCULATIONS OF X-RAY BREUSSTRAHLUNG SPECTRA AND SCINTILLATOR DETECTOR YIELDS FOR RELATIVISTIC ELECTRON ENERGIES FROM 10 keV TO 10 MeV Final Report
B. Grant Logan Aug. 1974 400 p
(RR0110941)
(AD-A006552; NRL-MR-2861) Avail: NTIS CSCL 20/9

Differential cross sections for emission of bremsstrahlung X-ray by relativistic electrons of energy from 10 keV to 10 MeV were calculated and tabulated as a function of incident electron energy, ratio of X-ray energy to electron energy, and angle of X-ray emission to incident electron direction, for nuclei of Z=1 and Z=22. The differential cross-sections integrated over angle and X-ray energy are also presented. From these X-ray spectra, ratios of X-ray transmission through various metal attenuators of several thicknesses and absorption in 1 inch Pilot B scintillators were calculated as a function of electron energy and angle between electron and detector. Author

N75-29903# Technion, Inc., Irvine, Calif.
MECHANISMS OF MAGNETOPLASMADYNAMIC ARC JET ACCELERATION PROCESSES Interim Scientific Report
Gordon L. Cann and Adriano Ducati Jan. 1975 43 p refs
(Contract F44620-74-C-0017; AF Proj. 9752)
(AD-A006234; AFOSR-75-0253TR; ISR-1) Avail: NTIS CSCL 20/9

A unique type of electric discharge has been discovered and some of its characteristics investigated. The discharge occurs between an impulsively heated cathode and a ring anode in an enclosed test cell that has been evacuated to 10 to the (-8) power Torr. It is a non-self-sustaining discharge that lasts for tens of milli-seconds in which the current transitions rapidly (about 2 microsec.) from a discharge mode to a cathode electron emission controlled mode at a critical voltage, (about 2,000 V at an ambient pressure of 10 to the (-8) power Torr.). The discharge has an impedance of approximately 3,400 ohms which increases when a solenoidal magnetic field is applied. In many respects, the discharge observed in the test cell is ideal for application to the Space Electric Ram Jet concept. GRA

N75-29904# California Univ., Los Angeles. Plasma Engineering Lab.
DESTABILIZATION OF HYDROMAGNETIC DRIFT-ALFVEN WAVES IN A FINITE PRESSURE COLLISIONAL PLASMA Interim Report
J. T. Tang Nov. 1974 124 p refs
(Grant AF-AFOSR-2339-72; AF Proj. 9751)
(AD-A006223; AFOSR-75-0250TR; UCLA-ENG-7486) Avail: NTIS CSCL 20/9

In a finite beta plasma, where the plasma pressure is an

appreciable fraction of the confining magnetic field energy-density, density-gradient driven drift waves couple with Alfven waves when the phase velocities of the two waves become comparable. The resulting hydromagnetic drift-Alfven waves separate into two branches - a drift mode and an Alfven mode, with both modes exhibiting magnetic field and localized density fluctuations near the coupling point. The dispersion relation of the collisional drift-Alfven wave is derived by using a slab-geometry, two-fluid model which includes finite beta, electron-ion collisions, ion-ion collisions, finite ion larmar radius, temperature fluctuations, and an axial electron current. A hydromagnetic drift mode is found to be unstable in a moderately dense plasma. A localized Alfven mode is destabilized only with the passage of an axial current along the plasma column. GRA

N75-29905# Rice Univ., Houston, Tex. Dept. of Space Physics and Astronomy.
MAGNETIC MERGING IN A COLLISIONLESS PLASMA
Thomas W. Hill Jan. 1975 60 p refs
(Contract F19628-73-C-0120; AF Proj. 8601)
(AD-A006408; AFCRL-TR-74-0035; SR-2) Avail: NTIS CSCL 20/9

The term magnetic merging refers here to a process whereby magnetic energy is dissipated in a region of magnetic-field reversal imbedded in a plasma, resulting in acceleration of the charged particles of the plasma. Merging has been widely discussed as a mechanism for particle acceleration in collisionless plasmas in space. In spite of the usefullness of the merging concept, however, there is no generally-accepted theory to describe the physics of the merging process. Part of this difficulty lies in the fact that the most important processes occur on such a small length scale that the usual description of the plasma as a classical fluid is not strictly valid. In this paper the author examines the merging phenomenon in terms of individual charged-particle dynamics, explicitly avoiding the use of the fluid approximation. GRA

N75-29906# TRW Systems Group, Redondo Beach, Calif.
DEVELOPMENT OF HIGH INTENSITY ION SOURCES Topical Report, 28 Jan. - 27 Sep. 1974
J. F. Friichtenicht 27 Sep. 1974 50 p ref
(Contract DNA001-74-C-0161; DNA Proj. NWET-AAXT)
(AD-A005824; DNA-3512T) Avail: NTIS CSCL 20/9

This report summarizes the progress made on an experimental program designed to provide data that will permit a reliable estimate to be made of the aluminum monoxide (AlO) concentration in the debris patch subsequent to a high altitude nuclear burst The technique used in the experiment involves firing a laser beam at an aluminum target. The resultant aluminum plasma is electrostatically accelerated to high energy and injected into a laboratory tank for subsequent measurements. GRA

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N75-29907*# Stevens Inst. of Tech., Hoboken, N.J. Dept. of Physics.
AN INVESTIGATION OF THE SNS JOSEPHSON JUNCTION AS A THREE-TERMINAL DEVICE Ph.D. Thesis
Hans Meissner and George Paul Prans Jun. 1973 150 p refs
(Grant NGL-31-003-020)
(NASA-CR-143254; SIT-P278(6/73)) Avail: NTIS HC $5.75 CSCL 20L

A particular phenomenon of the SNS Josephson junction was investigated; i.e., control by a current entering the normal region and leaving through one of the superconducting regions. The effect of the control current on the junction was found to be dependent upon the ration of the resistances of the two halves of the N layer. A low frequency, lumped, nonlinear model was proposed to describe the electrical characteristics of the device, and a method was developed to plot the dynamic junction resistance as a function of junction current. The effective thermal noise temperature of the sample was determined. Small signal linearized analysis of the device suggests its use as an impedance transformer, although geometric limitations must be overcome. Linear approximation indicates that it is reciprocal and no power gain is possible. It is felt that, with suitable metallurgical and geometrical improvements, the device has promise to become a superconducting transistor. Author

N75-29908*# Houston Univ., Tex.
FUTURE UTILIZATION OF SPACE: SILVERTON CONFERENCE ON MATERIAL SCIENCE AND PHASE TRANSFORMATIONS IN ZERO-GRAVITY, SUMMARY OF PROCEEDING
Melvin Eisner, ed. 1975 13 p refs Conf. held at Silverton, Colo., 3-6 Apr. 1975
(Contract NAS9-14316)
(NASA-CR-141936) Avail: NTIS HC $3.25 CSCL 20L

The importance of zero gravity environment in the development and production of new and improved materials is considered along with the gravitational effects on phase changes or critical behavior in a variety of materials. Specific experiments discussed include: fine scale phase separation in zero gravity; glass formation in zero gravity; effects of gravitational perturbations on determination of critical exponents; and light scattering from long wave fluctuations in liquids in zero gravity. It is concluded that the space shuttle/spacelab system is applicable to various fields of interest. J.M.S.

N75-29909*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
WEAR AND INTERFACIAL TRANSPORT OF MATERIAL
Donald H. Buckley 1975 30 p refs Proposed for presentation at 22d Natl. Vacuum Symp., Philadelphia, 28-31 Oct. 1975, sponsored by Am. Vacuum Soc.
(NASA-TM-X-71781; E-8392) Avail: NTIS HC $3.75 CSCL 20L

Bonding across the interface for two solids in contact and the subsequent transfer of material from one surface to another is a direct result of the interfacial bonds being stronger than the cohesive bonds in either of the two solids. Surface tools such as LEED, Auger emission spectroscopy, field ion microscopy, and the atom probe are used to examine adhesive contacts and to determine the direction, nature, quantity of material transfer and properties of the solids which effect transfer and wear. The electronic nature, cohesive binding energies, surface structure, lattice disregistry and distribution of species in surface layers are all found to effect adhesion and transfer or transport for clean surfaces in solid state contact. The influence of adsorbed and reacted surface films from fractions of a monolayer to multilayer reactive films are considered. It is shown that even fractions of a monolayer of surface active species such as oxygen and sulfur can markedly inhibit adhesion and transport. Author

N75-29910*# Westinghouse Research Labs., Pittsburgh, Pa.
SILICON RIBBON STUDY PROGRAM
R. G. Seidensticker and C. S. Duncan Jun. 1975 62 p refs
(Contract NAS3-18034)
(NASA-CR-134821; Rept-75-9C4-SIWEB-R1) Avail: NTIS HC $4.25 CSCL 20L

The feasibility is studied of growing wide, thin silicon dendritic web for solar cell fabrication and conceptual designs are developed for the apparatus required. An analysis of the mechanisms of dendritic web growth indicated that there were no apparent fundamental limitations to the process. The analysis yielded quantitative guidelines for the thermal conditions required for this mode of crystal growth. Crucible designs were then investigated: the usual quartz crucible configurations and configurations in which silicon itself is used for the crucible. The quartz crucible design is feasible and is incorporated into a conceptual design for a laboratory scale crystal growth facility capable of semi-automated quasi-continuous operation. Author

N75-29911# Istituto Superiore di Sanita, Rome (Italy). Lab. di Fisica.
MODULATION SPECTROSCOPY OF LAYER SEMICONDUCTORS GaSe AND GaTe
M. Grandolfo 30 Apr. 1974 39 p refs In ITALIAN; ENGLISH summary

(ISS-L-74/2) Avail: NTIS HC $3.75

A series of lectures on modulation spectroscopy is presented. Electro- and thermoreflectance spectra of layer gallium monochalcogenides GaSe and GaTe are particularly discussed. Author

N75-29912# Istituto Superiore di Sanita, Rome (Italy).
WEAK NON LEPTONIC DECAYS OF CHARMED HADRONS
G. Altarelli, N. Cabibbo, and L. Maiani 10 Mar. 1975 12 p refs
(ISS-P-75/4) Avail: NTIS HC $3.25

Weak non leptonic decays of charmed hadrons are studied in the SU(4)quark model with color. Relations for baryon decays following from a specific SU(3) behavior of the effective Hamiltonian, proposed in a previous paper, are presented and discussed. Consideration of the exact SU(4) limit leads to an estimate of the absolute widths of charmed baryons, and to a new relation among hyperon decay S-wave amplitudes, found to be violated to approximately 40%. Author

N75-29913# Research Inst. of National Defence, Stockholm (Sweden).
ON THE DETERMINATION OF THE PHOTO-IONIZATION ENERGY AND THE CONCENTRATION OF DEFECTS CREATED BY NUCLEAR RADIATION IN SILICON DIODES
Haekan Haekansson, Herman G. Grimmeiss, J. Lennart Lindstroem, and Bertil Sigfridsson Apr. 1975 13 p refs
(FOA-B-30003-A3; ISBN-91-7056-032-3) Avail: NTIS HC $3.25

Optical methods are used to determine the photoionization energy and the concentration of defects created by neutron and gamma radiation. The changes in electrical characteristics of the diodes are investigated, and a comparison is made between various types of diodes. Author

N75-29914*# Paine Coll., Augusta, Ga.
THE STUDY OF SINGLE CRYSTALS FOR SPACE PROCESSING AND THE EFFECT OF ZERO GRAVITY Final Report, 15 Jan. - 31 Aug. 1975
R. B. Lal Aug. 1975 38 p refs
(Grant NsG-8002)
(NASA-CR-143271; PC-NAS-003) Avail: NTIS HC $3.75 CSCL 20L

A study was undertaken to analyze different growth techniques affected by a space environment. Literature on crystal growth from melt, vapor phase and float zone was reviewed and the physical phenomena important for crystal growth in zero-gravity environment was analyzed. Recommendations for potential areas of crystal growth feasible for space missions are presented and a bibliography of articles in the area of crystal growth in general is listed. Author

N75-29915*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
DIRECT OBSERVATION OF SMALL CLUSTER MOBILITY AND RIPENING
Klaus Heinemann and Helmut Poppa Jul. 1975 28 p refs
(NASA-TM-X-62456; A-6173) Avail: NTIS HC $3.75 CSCL 20L

Direct evidence is reported for the simultaneous occurrence of Ostwald ripening and short-distance cluster mobility during annealing of discontinuous metal films on clean amorphous substrates. The annealing characteristics of very thin particulate deposits of silver on amorphized clean surfaces of single crystalline thin graphite substrates were studied by in-situ transmission electron microscopy (TEM) under controlled environmental conditions (residual gas pressure of 10 to the minus 9th power torr) in the temperature range from 25 to 450 C. Sputter cleaning of the substrate surface, metal deposition, and annealing were monitored by TEM observation. Pseudostereographic presentation of micrographs in different annealing stages, the observation of the annealing behavior at cast shadow edges, and measurements with an electronic image analyzing system were employed to aid the visual perception and the analysis of changes in deposit structure recorded during annealing. Slow Ostwald ripening was found to occur in the entire temperature range, but the overriding surface transport mechanism was short-distance cluster mobility. Author

N75-29916*# Avco Corp., Wilmington, Mass. Systems Div.
PHOTOELECTRON EMISSION ANALYSIS OF SURFACE ELEMENTS OF THE INTERNATIONAL SUN EARTH EXPLORER Final Report, 7 Jun. 1974 - 24 Feb. 1975
W. T. Spencer 24 Feb. 1975 27 p refs
(Contract NAS5-20592)
(NASA-CR-143811; AVSD-0055-75-RR) Avail: NTIS HC $3.75 CSCL 20L

The photoemission was measured of engineering materials (aluminum; copper, plain; copper, abraded; copper-beryllium; magnesium; silver; In2O3 on silica; reflective coating on silica; teflon; kapton; and Pyre ML) associated with the International Sun Earth Explorer (ISEE) Satellite. The procedures used are described, including the experimental equipment; results of the program, the conclusions reached, and areas for further work are presented. Data regarding the measured yield of the 11 materials whose surface emission was determined is included in the form of plots of photoelectric yield versus incident light wavelength. Author

N75-29917# Chemical Lab. RVO-TNO, Rijswikj (Netherlands).
THE EFFECT OF GASES ON THE CONDUCTIVE PROPERTIES OF ORGANIC SEMICONDUCTORS. PART 5: RESULTS FOR FILMS OF CHLORANIL, PHENANTHRENE, PHENAZINE, PHTALOCYANINE (METAL FREE) AND CRYSTAL VIOLET
A. Roberti and P. C. M. VanWoerkom Jun. 1974 32 p refs
(CL-1974-13-Pt-5; TDCK-65366-Pt-5) Avail: NTIS HC $3.75

The effect of gases on the dark and photoconductivity of various compounds was investigated to determine suitability of these compounds for detecting, sensitively and selectively, atmospheric contaminants. Results indicate that the changes of the dark conductivities of the investigated compounds are large on adsorption of several gases; however, the reproducibility, sensitivity, and selectivity seem insufficient for contructing a reliable multicomponent gas detector on this basis. Selectivity is improved by considering data from photoconductivity measurements. Sensitivity and response time of the semiconductors investigated are reasonable for strong electron donating and electron accepting gases. For weak electron donating and electron accepting gases, no significant effect was measured. The reversibility of gas adsorption on the semiconductor surfaces is poor, especially in the case of very aggressive gases.
Author (ESRO)

N75-29918# Texas Univ., Austin. Dept. of Chemical Engineering.
MAGNETIC AND ELECTRICAL PROPERTIES OF NOVEL COMPOUNDS IN THE ALKALINE EARTH-TRANSITION METAL-SULFUR AND SELENIUM SYSTEMS Final Report, 1 Oct. 1971 - 31 Aug. 1974
Hugo Steinfink Oct. 1974 19 p refs
(Grant AF-AFOSR-2199-72; AF Proj. 9764; AF Proj. 6813)
(AD-A005723; AFOSR-75-0303TR) Avail: NTIS CSCL 20/12

The interrelationship between crystal structure and electrical and magnetic compounds has been investigated. It has been shown that the physical behavior of Ba-Fe-S compounds can be predicted from a knowledge of the crystal structure and the presence of mobile or localized electrons. An unusually large range of temperature independent electrical conductivity has been observed for BaCu4S3. GRA

N75-29919# Princeton Univ., N.J. Dept. of Chemical Engineering.
POLYPHOSPHAZENES: THERMOMECHANICAL TRANSITIONS Technical Report, Jul. 1974 - Mar. 1975
T. M. Connelly and J. K. Gillham Mar. 1975 30 p refs
(Contract N00014-67-A-0151-0024; NR Proj. 356-504)
(AD-A006328; TR-26) Avail: NTIS CSCL 11/9

The dynamic mechanical behavior (approximately 1 Hz) of four linear phosphazene homopolymers, two copolymers and two physical blends with overall composition approximating the copolymers, was examined between -180 and 250 C in an inert atmosphere. Crystal/melt, crystal/crystal, glass and glassy-state transitions were documented and the effect of high temperature on the transitions was investigated. A glassy-state transition in each fluoroalkoxypolyphosphazene was attributed to motion of the substituents. Author

N75-29920# Army Tank-Automotive Command, Warren, Mich.
THE RAYLEIGH VELOCITY FOR A SLIGHTLY ANISOTROPIC, ORTHOTROPIC SOLID Final Report, Jun. 1973 - Jun. 1974
Grant R. Gerhart Aug. 1974 23 p refs
(DA Proj. 1T1-61102-B-11A)
(AD-A006148; TACOM-TR-11933) Avail: NTIS CSCL 20/12

A technique is described for calculating the changes in the propagation velocity of Rayleigh waves for slightly anisotropic media. The Rayleigh Equation is first derived for the isotropic case. Perturbation theory is used to approximate the solutions to the Rayleigh Equation for a slightly anisotropic solid with orthotropic symmetry. Velocity changes appear as additional correction terms to the unperturbed Rayleigh Equations. These terms are classified into two distinct types; one is derived from variations of the independent variables in the Rayleigh Equation, and the second type is derived from changes in the functional form of the isotropic Rayleigh Equation. The correction factors are functions of the third-order non-linear elastic constants. The independent third-order constants are determined by applying external stresses along two mutually perpendicular directions and measuring the changes in Rayleigh wave velocity. Appendix A1 contains the calculation for the case of aluminum. GRA

N75-29921# Army Foreign Science and Technology Center, Charlottesville, Va.
ELECTRICAL AND THERMOEMISSION PROPERTIES OF ALLOYS LANTHANUM AND CERIUM HEXABORIDES WITH TRANSITION METALS
G. V. Samsonov, Yu. B. Paderno, V. P. Bondarenko, and B. A. Kovenskaya 15 Nov. 1974 14 p refs Transl. into ENGLISH from Redkozem. Metally i ikh Soedineniya (USSR), v. 70, 1970 p 119-128
(AD-A005980; FSTC-HT-23-179-75) Avail: NTIS CSCL 20/12

Resistivity and thermo-EMF are studied for lanthanum and cerium hexaboride alloys containing from 0.5% to 15% W, Ta, Re, or Hf. With increasing transition-metal concentration, resistivity first decreased sharply and then gradually increased. Addition of elements capable of raising the proportion of atoms with stable (d sub 0) and (d sub 5) configurations can markedly improve the thermoemission properties of rare-earth hexaborides. GRA

N75-29922# Army Foreign Science and Technology Center, Charlottesville, Va.
WORK FUNCTION AND ADSORPTION PROPERTIES OF YTTRIUM GROUP RARE EARTH METALS
O. K. Kultashev and S. E. Rozhkov 1 Nov. 1974 15 p refs Transl. into ENGLISH from Redkozem. metal. i ikh Soedineniya (USSR), v. 70, 1970 p 66-70
(AD-A005979; FSTC-HT-23-177-75) Avail: NTIS CSCL 20/12

Experimental methods are described for determination of the work functions of REM as the metals and in thin films and for determination of the heat of adsorption. The work functions in thin films decrease over time and then rise to a constant value. The heats of adsorption of Gd, Ho and Er decrease with increase in atomic number but that of lutetium is highest of all, and appears to be independent of the substrate. The differences in work functions of thulium and lutetium appear to be connected with the fact that the f shell of the latter is completely filled and the f shell of the former is generally empty. The change in heat of adsorption apparently involves weakening of the metallic bonds of the adsorbed atoms and formation of ionic bonds between the adatoms and the substrate atoms. GRA

N75-29923# Army Foreign Science and Technology Center, Charlottesville, Va.
WORK FUNCTION OF THE (100) FACES OF SINGLE CRYSTALS OF REFRACTORY METAL ALLOYS
N. B. Smirnova, B. G. Smirnov, and E. P. Sytaya 6 Sep. 1974 7 p refs Transl. into ENGLISH from Tashkent Univ. Nauchnye Trudy (USSR), no. 393, 1971 p 230-236
(AD-A005967; FSTC-HT-23-935-74) Avail: NTIS CSCL 11/6

Results of measurement of the work functions of the (100) faces of two tungsten-base alloys and one tantalum-base alloy are presented. The crystals studied, of W-Re 5, W-Ta 1 and Ta-Mo 20, were grown by zone equalization and had spontaneous (100) orientation. The work functions of the W-Re 5 and Ta-Mo 20 alloys were close to (100) of pure W and Mo, and they were considerably below the work functions of the (100) faces in W and Ta for W-Ta 1 alloy. GRA

N75-29924# Office of Naval Research, London (England).
MOLECULAR DYNAMICS CALCULATORS AT ORSAY
Benson R. Sundheim 20 Jan. 1975 14 p
(AD-A006027; ONRL-R-1-75) Avail: NTIS CSCL 07/4

Studies on the molecular dynamics of ionic liquid and solid systems carried out in connection with the CECAM meeting at Orsay (July 1974) are described. They include specific results in the NaCl crystal and various ionic liquids as well as examinations of the legitimacy of various approximations. In addition, work on the statistical mechanics and molecular dynamics being done by Professor Verlet's group is summarized. GRA

N75-29925# Naval Postgraduate School, Monterey, Calif.
STUDY OF INFRARED SOLID STATE IMAGES USING CHARGE TRANSPORT DEVICES M.S. Thesis
Ralph Frederick Renzelman, Jr. Dec. 1974 95 p refs
(AD-A005736) Avail: NTIS CSCL 09/5

The purpose of this thesis is two fold. The first was to develop a fabrication procedure for a MIS device for infrared imaging. TiO2 insulator would provide large storage capacity for the IV-VI semiconductor, PbTe. Although a complete device wasn't fabricated, significant progress was made in identifying the desirable characteristics and in relative merits of several different approaches. The second part involves a system study comparing the infrared vidicon with CTD's to determine the feasibility of solid state imaging. By comparing these systems it was found that solid state imaging is feasible with improvement schemes such as background suppression and using read only memory or automatic gain control to overcome nonuniformities. GRA

N75-29926# IBM Watson Research Center, Yorktown Heights, N.Y.
INVESTIGATION OF ION IMPLANTATION AS A DOPING TECHNIQUE FOR THE 3-5 SEMICONDUCTORS AND TERNARY ALLOY SYSTEMS Final Report
Billy L. Crowder 14 Feb. 1975 70 p refs
(Contract F44620-71-C-0040)
(AD-A006465; AFOSR-75-0320TR) Avail: NTIS CSCL 20/12

The inadequacy of SiO2 as a protective coating on GaAs for n-type implanted dopants was established. An investigation of alternative passivating layers was undertaken. Si3N4 was demonstrated to be effective as a protective coating and, when used in conjunction with elevated substrate temperatures during implantation, yielded n-type GaAs with a high doping efficiency for the implanted ions. Photoluminescence studies of Si-implanted GaAs indicated the existence of new species, presumably complexes between Si and damage induced point defects. Photoluminescence studies of Zn-implanted GaN demonstrated that ion damage is responsible for decreasing luminescence efficiency with increasing Zn dose for room temperature implantations and that higher efficiencies can be obtained by implantations at 300C. Preliminary results of ion implantation into AlN are presented. GRA

N75-29927# Army Foreign Science and Technology Center, Charlottesville, Va.
RESEARCH ON SEMICONDUCTOR PHYSICS IN THE ELECTROPHYSICAL DEPARTMENT, 25TH ANNIVERSARY OF THE FOUNDING OF V. I. LENIN KISHINEV STATE UNIVERSITY
A. V. Simashkevich 17 Jun. 1954 19 p refs Transl. into ENGLISH from Tr. po Fiz. Poluprov. Kishinevsk. Gos. (Kishinev), no. 3, 1971 p 208-223
(AD-A006092; FSTC-HT-23-419-74) Avail: NTIS CSCL 20/12

Research on production and various characteristics of crystals, thin layers and heterojunctions, as well as the effect of various impurities on these characteristics, principally of CdSe, ZnSe, CdTe and ZnTe semiconductors and ZnTe-CdTe and ZnSe-CdSe systems is reported. Investigation of the phenomena of electroluminescence and its mechanisms of action also is reported.

A bibliography is presented of 100 works published by the members of the department. GRA

N75-29928# Army Foreign Science and Technology Center, Charlottesville, Va.
SEMICONDUCTOR MICROELECTRONICS
A. I. Kurnosov and E. N. Voronkov 28 May 1974 27 p refs Transl. into ENGLISH from unidentified Russian monograph
(AD-A006074; FSTC-HT-23-366-74) Avail: NTIS CSCL 09/1

The preface and introduction briefly describe the stages of development of miniaturization in radioelectronics equipment outside the USSR, including circuit densities, production volume and costs. Various devices for making static and dynamic measurements of integrated circuits, before and after encapsulation, with computer processing of measurements and, in recent models, computer control of the test unit, installed on the assembly line, are discussed and illustrated. Characteristics, productivity and types of measurements made are presented for two Sylvania Company systems, the Fairchild Company series, and three Westinghouse systems, two of which use a scanning electron microscope under computer control and one of which uses the electron microprobe. GRA

N75-29929# Army Foreign Science and Technology Center, Charlottesville, Va.
ADMIXTURES IN GERMANIUM, SILICON AND GALLIUM ARSENIDE RECOMBINATION CHARACTERISTICS
K. D. Glinchuk 14 Jun. 1974 21 p refs Transl. into ENGLISH from Poluprov. Tekh. Mikroelektron. Resp. Mezhvedomstv. Sb. (USSR), no. 7, 1972 p 51-60
(AD-A006097; FSTC-HT-23-0425-74) Avail: NTIS CSCL 20/12

This article reports on the recombining characteristics of admixtures in germanium, silicon and gallium arsenide. The nature and characteristics of energy levels (donor or acceptor, ionization, etc.) depend on the electron structure of admixture atoms and atom lattices and also on their position in the crystalline lattice of the semiconductor. The relationship of the dimensions of admixture atoms and the lattice is also important. The possibility of creating covalent bonds with atoms of the main lattice is of basic importance. Results of research in this area are presented. GRA

N75-29930# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
RADIATION INDUCED ELECTRON EMISSION Physical Science Research Papers
John N. Bradford 22 Nov. 1974 29 p refs
(AF Proj. 5621)
(AD-A006396; AFCRL-PSRP-614; AFCRL-TR-74-0583) Avail: NTIS CSCL 20/12

Electron fluxes generated by photons or charged particles interacting with solid materials can emerge from the boundaries of those materials. The electron current densities arising from these spectra constitute source functions for vulnerability studies on systems exposed to internal electromagnetic pulse (IEMP, SGEMP). Absolute yield measurements have been made from tantalum, molybdenum, copper, and aluminum. The energy and angular distribution have been determined and are used as comparison bases for computation. Examples from several sources are described. GRA

N75-29931# Texas Univ., Austin.
AMORPHOUS SEMICONDUCTORS Final Technical Report, 1 Apr. 1973 - 30 Sep. 1974
James C. Thompson Sep. 1974 163 p refs
(Grant DA-ARO(D)-31-124-73-G81; ARPA Order 1562)
(AD-A005831) Avail: NTIS CSCL 20/12

This work has been based entirely on studies of bulk semiconducting alloy glasses mainly from Ge, Te, As, Se combinations. Known amounts of the desired constituents (five 9's pure) are crushed, then weighed out in an inert gas atmosphere. They are then placed in a quartz ampoule, sealed off under fore-pump vacuum, and placed in a rocking tube furnace. Heating cycles depend on the material used but generally involved temperatures near 800C and periods of approximately one day. Samples were dropped from the furnace to an air or water quench. Once the glass ingot is removed from the ampoule it is cut into suitable lengths. The report provides details of work on sample preparation and other experimental procedures; together with results on equation-of-state, the glass-transition phenomenon, and dc and ac conductivity. GRA

N75-29932# South Carolina Univ., Columbia. Coll. of Engineering.
CHARACTERIZATION OF SILICON CARBIDE Final Report, 21 Nov. 1971 - 30 Jun. 1974
J. W. Faust, Jr. and R. B. Hilborn, Jr. 30 Oct. 1974 14 p refs
(Contract F19628-72-C-0136; AF Proj. 5620)
(AD-A006409; AFCRL-TR-74-0609) Avail: NTIS CSCL 20/12

The various electrical and structural measurement techniques for silicon carbide are described. The electrical measurements include conductivity, resistivity, carrier concentration, mobility, doping energy levels, and lifetime. The structural measurements include polytype determination and crystalline perfection. Both bulk and epitaxial films are included. GRA

N75-29933# Rockwell International Science Center, Thousand Oaks, Calif.
D-BAND SURFACE STATES ON WIDE BAND GAP INSULATORS. A CONCEPTUAL MODEL FOR SURFACE STATES AND CATALYSIS ON D-BAND PEROVSKITES Final Report, Jul. 1973 - Dec. 1974
F. J. Morin and T. Wolfram 6 Jan. 1975 54 p refs
(Contract F44620-72-C-0050; AF Proj. 9761; AF Proj. 6813)
(AD-A005783; SC529.3FR; AFOSR-75-0219TR) Avail: NTIS CSCL 07/4

This paper proposes a conceptual model to describe some of the factors believed to be most important in catalyzing a reaction on a transition metal oxide. An hypothetical situation is constructed from a model reaction, the dimerization of ethylene to form cyclobutane, and a model perovskite, SrTiO3. A detailed discussion is given of the symmetry imposed energy barrier for the gas phase reaction. Using SrTiO3 as an example, it is shown that the perovskites possess highly localized, atomic-like d surface states of the required symmetry. Two semiquantitative examples are developed for the catalyzed dimerization of ethylene on the (100) surface of SrTiO3. A preliminary discussion is given of the role played by surface potentials in promoting the reaction. GRA

N75-29934# Rockwell International Science Center, Thousand Oaks, Calif. Science Center.
STUDY OF GRAIN BOUNDARY SEGREGATION RELATING TO INTERGRANULAR FRACTURE Final Report, 1 May 1971 - 31 Dec. 1974
Harris L. Marcus 1975 15 p refs
(Contract F44620-71-C-0059; AF Proj. 9761)
(AD-A006422; SC510.6FR; AFOSR-75-0383TR) Avail: NTIS CSCL 11/6

The results of this program are: The first direct experimental evidence for the phenomena of metastable grain boundary segregation and a model for its relation to the influence of environments on fracture behavior; The influence of grain boundary segregation on the grain boundary fracture of carburized steels; The segregation of As to the transgranular fracture surface of steels and how it related to the lowering of the fracture resistance of these steels; An electrochemical method of charging samples with both hydrogen and hydrogen recombination poisons to subsequently induce grain boundary failure in the Auger electron spectroscopy fracture studies of iron and nickel alloys; The application of X ray photoelectron spectroscopy to determine changes in electronic structure that can be related to the nature of the local bonding in the segregated region of iron intermetallic compounds. GRA

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

N75-29935 British Library Lending Div., Boston Spa (England).
THERMODYNAMIC ANALYSIS OF DIRECT LOW-TEMPERATURE CYCLES
V. S. Martynovskii and I. M. Shnaid Jul. 1975 9 p refs Transl. into ENGLISH from Izv. Vysshikh Uchebn. Zavendenii, Energ. (Minsk), no. 3, 1973 p 84-89
(BLL-RTS-9548) Avail: British Library Lending Div., Boston Spa, Engl.: £5.00; 8 BLL photocopy coupons

Low-temperature direct cycles are defined as those in which heat is communicated to the working substance at temperatures below the ambient temperature T sub O. The thermodynamic aspect of the use of low-temperature cycles which is directly associated with the concept of ambient medium is discussed. Ambient medium is defined as a heat source (receiver) which satisfies two criteria: (1) it should be able to emit or absorb heat without significant temperature change (practically infinite heat capacity); (2) it should be able to transfer heat (from or to the working substance) with minimal expenditures of energy and money (cost) within the given system. The conversion coefficients of reference cycles of heat engines and refrigerating machines are also defined. Author

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N75-29003* Princeton Univ., N.J.
SOME DEVELOPING CONCEPTS OF ENGINEERING EDUCATION
Courtland D. Perkins *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 11-24 (For availability see N75-29001 20-01)
CSCL 05I

N75-29004* McDonnell-Douglas Corp., St. Louis, Mo.
CURRENT AND FUTURE OPPORTUNITIES IN AERONAUTICAL ENGINEERING
J. C. Brizendine *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 25-60 (For availability see N75-29001 20-01)
CSCL 05C

N75-29005* Stanford Univ., Calif.
THE PREDICAMENT OF AERONAUTICAL ENGINEERING EDUCATION AND WHAT WE CAN DO ABOUT IT
Arthur E. Bryson, Jr. *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 61-64 (For availability see N75-29001 20-01)
CSCL 05I

N75-29006* Washington Univ., Seattle.
THE PREDICAMENT OF AERONAUTICAL ENGINEERING EDUCATION AND WHAT WE CAN DO ABOUT IT
R. J. H. Bollard *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 65-70 (For availability see N75-29001 20-01)
CSCL 05I

N75-29017* Kansas Univ., Lawrence.
THE ME/DE DEGREE AT THE UNIVERSITY OF KANSAS
Kenneth H. Lenzen *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 353-356 (For availability see N75-29001 20-01)
CSCL 05I

N75-29018* Iowa State Univ. of Science and Technology, Ames.
A PROPOSED UNIVERSITY/INDUSTRY/GOVERNMENT COOPERATIVE AERO EDUCATIONAL PROGRAM
Robert F. Brodsky *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 357-368 ref (For availability see N75-29001 20-01)
CSCL 05I

N75-29019* Boeing Co., Seattle, Wash.
UNIVERSITY/GOVERNMENT/INDUSTRY RELATIONS IN AERONAUTICS
George S. Schairer *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 369-372 (For availability see N75-29001 20-01)
CSCL 01B

N75-29023* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CURRICULUM FOR MODERN AERONAUTICS
Leonard Roberts *In its* NASA/Univ. Conf. on Aeron. 1975 p 389-392 (For availability see N75-29001 20-01)
CSCL 05I

N75-29024* Massachusetts Inst. of Tech., Cambridge.
ENGINEERING EDUCATION FOR THE 1980'S: A SPECULATION
Eugene E. Covert *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 393-401 (For availability see N75-29001 20-01)
CSCL 05I

N75-29025* Boeing Co., Seattle, Wash.
WHAT KIND OF STUDENTS SHOULD BE DEVELOPED THROUGH AERONAUTICAL ENGINEERING EDUCATION?
Richard B. Holloway *In* NASA. Langley Res. Center NASA/Univ. Conf. on Aeron. 1975 p 403-410 refs (For availability see N75-29001 20-01)
CSCL 05I

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N75-29936 British Library Lending Div., Boston Spa (England).
COST ACCOUNTING AT LARGE RESEARCH CENTERS
J. Schulte-Hillen 4 Feb. 1975 55 p refs Transl. into ENGLISH from the German report DLR-FB-73-64
(BLL-RAE-Trans-5207-(1765); DLR-FB-73-64) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.: 16 BLL photocopy coupons

A survey of cost accounting at German large-scale research centers is given, based on a questionnaire: an investigation into the legal aspects of designing a system of cost accounting in major research is discussed. The objectives are presented of a cost accounting system specially geared to the responsibilities of major research. The question is discussed as to how far the findings of economic science, as developed for the commercial production of goods, can be transferred to the 'production of information', and what methods of cost accounting are suitable for application to major research. A system of cost accounting based on the principle of direct costing was developed, which is adapted to a system of standard cost accounting, The proposed method consists of cost, category, cost center and cost unit accounting, each of which expanded only to an extent necessary for research; particular attention is paid to avoiding any exaggerated coding system for the appointment of costs.

Author

N75-29937* Pittsburgh Univ., Pa. Dept. of Earth and Planetary Sciences.
STUDIES RELATED TO THE SURFACES OF THE MOON AND PLANETS Annual Report, 1 Apr. 1973 - 31 Mar. 1974

Bruce Hapke 31 Mar. 1974 55 p refs
(Grant NGL-39-011-085)
(NASA-CR-143268) Avail: NTIS HC $4.25 CSCL 03B

A variety of glasses of lunar composition were prepared with different amounts of Fe and Ti under both reducing and oxidizing conditions, and also by sputter-deposition and thermal evaporation and condensation. These materials were analyzed by wet chemical, electron microprobe, ESR, Mossbauer and magnetic methods. The effects of darkening processes on surface soils of airless bodies are discussed along with the effects of vapor phase deposition processes on the optical, chemical, and magnetic properties of the lunar regolith. Author

N75-29938# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN ANALYSIS OF THE EFFECTIVENESS OF ASPR IN PROVING GUIDANCE FOR THE UTILIZATION OF GOVERNMENT-OWNED INDUSTRIAL PLANT EQUIPMENT M.S. Thesis
Joseph A. Insley and Ronald T. McBride Jan. 1975 83 p refs
(AD-A006351; SLSR-24-75A) Avail: NTIS CSCL 15/5

The control of Industrial Plant Equipment (IPE) is an integral part of Government Property Administration. The Department of Defense tends to weaken efficient management of Government-owned IPE in the possession of its contractors by failing to establish stricter standards for IPE utilization. Although Appendix B of the Armed Services Procurement Regulation (ASPR) contains guidance for the development of utilization procedures, it tends to be somewhat vague and subject to interpretation by both Government Property Administrators and contractors alike. The authors analyzed twenty-five approved utilization procedures and evaluated the content of these procedures against the requirements of ASPR Appendix B-603.1. They concluded that the present ASPR requirements are inadequate to provide the management control necessary to insure that IPE in the possession of contractors is properly utilized or declared excess when no longer required in support of a contract. They also contend that some utilization procedures in being do not meet the minimum requirements of ASPR. GRA

N75-29939# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN INVESTIGATION OF A PROPOSED AUCTION TECHNIQUE AS A METHOD OF PROCUREMENT M.S. Thesis
Willie J. Freeman, Jr. and Robert G. Welbaum Jan. 1975 152 p refs
(AD-A006350; SLSR-21-75A) Avail: NTIS CSCL 15/5

The Department of Defense procurement system has not always been effective in establishing a reasonable price. This thesis: purpose was to investigate an Auction Technique as an alternative procurement method. Formal Advertising was used for comparison purposes. Four tests were made: (1) determine the reliability of both procurement methods by comparing the results of a hypothetical procurement to a predictive model, (2) determine which procurement method would result in the lowest price, (3) investigate how bids would change when the expectation of future business changed, and (4) determine the difference between the lowest bid and the second lowest bid for each procurement method. GRA

N75-29940# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN EVALUATION OF THE MAJOR QUALIFICATIONS DESIRED OF AIR FORCE SYSTEM PROGRAM MANAGERS M.S. Thesis
Ralph E. Smythe and William J. McMullan Jan. 1975 104 p refs
(AD-A006360; SLSR-31-75A) Avail: NTIS CSCL 05/9

The study conducted an exploratory evaluation on the education, experience, and managerial trait qualifications desired of system program managers over the program life cycle. Interviews were conducted with the present system program managers of major Air Force programs to obtain data bearing on the relationship of the desired qualifications between the individual stages. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N75-29941# Istituto Superiore di Sanita, Rome (Italy).
AUTOMATIC GENERATION OF IDENTIFICATION RECORDS FOR ARCHIVES BUILDING
R. Capocaccia 2 Jul. 1974 22 p refs In ITALIAN; ENGLISH summary
(ISS-T-74/6) Avail: NTIS HC $3.25

A program for information retrieval of individual records based on generation of a directory file made of identification terms was written in FORTRAN IV language. The identification terms are codified in a way to maximize their content of information. The program is apt to work on small to medium size computers with no direct-access media available. Author

N75-29942*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.
FUNCTIONAL DESIGN SPECIFICATION FOR STOWAGE LIST AND HARDWARE TRACKING SYSTEM (SLAHTS)
D. J. Keltner Apr. 1975 107 p
(Contract NAS9-12200)
(NASA-CR-144368; LEC-5748) Avail: NTIS HC $5.25 CSCL 05B

This functional design specification defines the total systems approach to meeting the requirements stated in the Detailed Requirements Document for Stowage List and Hardware Tracking System for the space shuttle program. The stowage list and hardware tracking system is identified at the system and subsystem level with each subsystem defined as a function of the total system. Author

N75-29943*# Lockheed Electronics Co., Houston, Tex.
FUNCTIONAL DESIGN SPECIFICATION FOR THE PROBLEM DATA SYSTEM
T. W. Boatman Jun. 1975 67 p refs
(Contract NAS9-12200)
(NASA-CR-144358; LEC-6329) Avail: NTIS HC $4.25 CSCL 05B

The purpose of the Functional Design Specification is to outline the design for the Problem Data System. The Problem Data System is a computer-based data management system designed to track the status of problems and corrective actions pertinent to space shuttle hardware. Author

N75-29944*# Ohio State Univ., Columbus. ElectroScience Lab.
ATS-6 MILLIMETER WAVELENGTH PROPAGATION EXPERIMENT Quarterly Report, 15 Oct. 1974 - 14 Jan. 1975
D. M. Theobold and D. B. Hodge Apr. 1975 16 p refs
(Contract NAS5-21983)
(NASA-CR-143829; ESL-3863-4) Avail: NTIS HC $3.25 CSCL 20N

The real time digital data acquisition system used to acquire ATS-6 propagation data at the fixed, transportable, and unmanned terminals is described. This system performs all digital conversion, formating, merging, and recording. All data from the remote sites are transferred to the fixed terminal for recording on a common digital tape. The current status and summary of operations are also reviewed. Author

N75-29945# Defence Scientific Information Service, Ottawa (Ontario).
IMPLEMENTATION OF A MINI-COMPUTER BASED INFORMATION SYSTEM. PART 18. A GENERAL FILE DUMP PROGRAM FOR THE VARIAN 620 COMPUTER
Gordon W. Plunkett Dec. 1974 53 p refs
(AD-A008519; DSIS-TM-1/75(DIP)) Avail: NTIS CSCL 09B

The implementation of a mini-computer based information system requires the development of a convenient, easy-to-use systems program, which can aid the operator or programmer in

diagnosing programming bugs or machine failures. This memorandum presents a multipurpose utility program called the Tape Dump and Utility Monitor (TDUM) program which is tailored around the data analysis requirements at DSIS, but would be advantageous to any installation which has a Varian computer and external storage equipment. TDUM is written in Varian DAS assembler language and requires the Varian Master Operating System package. The program currently performs many diverse functions and this report examines the purpose and logic behind the various TDUM routines. Flowcharts and examples of input requests and various types of output dumps are included. GRA

N75-29946# Lincoln Lab., Mass. Inst. of Tech., Lexington.
HIGH RESOLUTION SPECTRAL ESTIMATES
Leroy C. Pusey 21 Jan. 1975 102 p refs
(Contract F19628-73-C-0002; AF Proj. 627A)
(AD-A006406; TN-1975-7; ESD-TR-75-106) Avail: NTIS CSCL 09/14

The Maximum Likelihood Method and the Maximum Entropy Method of spectral estimation are described and interpreted in terms of the innovation filter concept. Algorithms are developed for mapping an observed data sequence into the spectral estimates. The resolution performance of these spectral estimation algorithms is compared by applying each to simulated data containing two tones in white noise. GRA

N75-29947# Defense Documentation Center, Alexandria, Va.
MACHINE-AIDED RETRIEVAL Technical Progress Report, Jun. 1974 - Jun. 1975
James W. Norwood, Jr. Feb. 1975 44 p
(AD-A006500; DDC-TR-75-1) Avail: NTIS CSCL 05/2

The report is a comparison analysis of Machine-Aided Retrieval (MAR) and Machine-Aided Indexing (MAI) terminology for system compatibility with the Natural Language Data Base (NLDB). The terminology was randomly obtained from the natural language of bibliography requests. GRA

N75-29948# Army Troop Support Command, St. Louis, Mo.
DESIGNING A MANUAL COST DATA BASE Final Report
Hal W. Stephenson 28 Feb. 1975 29 p refs
(AD-A006508; TROSCOM-TR-75-1) Avail: NTIS CSCL 05/2

A six-step method for designing a manual cost data base is presented in this report. Indexes and sections of use in a cost data base are defined. An example is given. Prototype forms for eight indexes, an accession logbook and an abstract logbook are illustrated. The description is sufficiently detailed so a military organization with significant cost research activities could adapt the system to its own needs. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N75-29949# George Washington Univ., Washington, D.C. Program of Policy Studies in Science and Technology.
SCIENCE, TECHNOLOGY, AND DETENTE
Lewis M. Branscomb Mar. 1975 39 p refs
(Grant NSF ST-42625)
(PB-240818/5; GWPS-OP-17) Avail: NTIS HC $3.75 CSCL 05C

Scientific and technological relations with the U.S.S.R. as they are developing in the context of 'detente' raise questions of national policy that have only been inadequately addressed but for which the federal government is not adequately organized. In bilateral negotiations beginning with the Nixon-Brezhnev agreement of May 1972, the transfer of industrial technology has been raised as an explicit aspect of scientific and technical relationships as well as an aspect of economic policy as it relates to export controls. GRA

N75-29950# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
ECONOMIC ANALYSIS AND NEW STARTS OF FEDERAL GOVERNMENT COMMERCIAL OR INDUSTRIAL ACTIVITIES M.S. Thesis
William M. Duke and Paul E. Lang Jan. 1975 138 p refs
(AD-A006359; SLSR-30-75A) Avail: NTIS CSCL 15/5

The Executive Branch of the United States Government has stated that the Government will rely upon the private enterprise system to provide the goods and services it needs except in specific instances where reliance upon private enterprise would not be in the national interest. One such instance occurs when procurement of goods or services would be more costly than government production of them through the operation of commercial or industrial activities. The authors demonstrate that proposals to procure goods and services or produce them by means of new starts are alternate long-term capital budgeting proposals which should be evaluated on the basis of future costs and benefits, the time value of money, and quantitative analysis of risk. GRA

N75-29951# Naval Postgraduate School, Monterey, Calif.
TECHNICAL PROGRESS AND INDUSTRIAL DEVELOPMENT IN A DEVELOPING ECONOMY M.S. Thesis
Bambang Pramartadi Dec. 1974 33 p refs
(AD-A005734) Avail: NTIS CSCL 05/3

This study of development theory contains an analysis of technical progress and industrial labor force absorption in a model of a closed economy. The production process for the system is described by a neoclassical production function with factor-augmenting technical change. This study is directed to the study of economic development in a low income country. GRA

N75-29952# Mathematics and Computation Lab., McLean, Va.
THE MCL-THUROW MODEL SUPPLEMENT Final Report
Patricia R. Devine Feb. 1975 117 p
(PB-241113/0; GSA/OP/MCL-TR-96) Avail: NTIS HC $5.25 CSCL 05C

Changes and additions to the model, notably the updating to a 1972 model and the extension of the Personal Consumption Expenditures submodel are reported. A new module in the Contingency Impact Analysis System is also described. GRA

N75-29953# Little (Arthur D.), Inc., Cambridge, Mass.
ECONOMIC IMPACT OF SHORTAGES ON THE FERTILIZER INDUSTRY Final Report
Jan. 1975 259 p
(Contract FEA-C-50068-00)
(PB-240418/4; ADLC-77382; FEA/EI-50068) Avail: NTIS HC $8.50 CSCL 07A

Information is provided on the basic structure, characteristic, and problems of the fertilizer industry. Particular emphasis is placed on fuel use and substitutability as well as the impact of fertilizer on farm production. GRA

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

No abstracts in this category.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

N75-29954# Bundesministerium fuer Forschung und Technologie, Bonn (West Germany).
WHELL/TRACK TECHNOLOGIES Final Report [STATUS-

REPORT ZUM THEMENBEREICH RAD/SCHIENE-TECHNOLOGIEN]
Dec. 1974 271 p refs In GERMAN; ENGLISH summary
Proc. of the Statusseminar, Munich, 6-8 May 1974
(BMFT-FB-T-74-42) Avail: NTIS HC $8.50; ZLDI, Munich 56,95 DM

Results of investigations in the field of rapid transit systems are reported. The following topics are discussed: analysis of wheel/rail interaction based on a dynamic model; development, construction, and testing of a prestressed concrete slab track; supporting and conducting elements and complete bogies, conception of a wheel-rail dynamic simulator for wheelsets, bogies, and vehicles; and contact wire pantograph simulation and computer program. ESRO

N75-29955# Transportation Systems Center, Cambridge, Mass.
AIR TRAFFIC DEMAND ESTIMATES FOR 1995 Final Report, 1 Jul. 1973 - 30 Jun. 1974
R. H. Reck and J. B. Hagopian Mar. 1975 93 p refs
(PB-241083; DOT-TSC-OST-74-18) Avail: NTIS CSCL 01B

Transportation report is a projection of 1995 air traffic environment used in connection with the Department's Advanced Air Traffic Management System Study. The demand measures are based on FAA ten year projections to 1984 and include the fleet size and number of operations for air carrier, general aviation, and military aircraft, the number of airports and hubs, and the peak number of airborne aircraft in both terminal and en route airspace regions. The results of one analysis on high density airport capacity are included. Data in this report are presented for 1972, 1984, and 1995. Forecast growth in the demand for air transportation between 1972 and 1995 is predicted to result in a fleet of 362,00 aircraft (7,000 air carrier, 335,000 general aviation, and 20,000 military); tripled general aviation operations; an increase in the number of IFR operations by a factor of 13 a 50 percent increase in the number of civil airports; and a 250 percent increase in the number of aircraft airborne at the peak instant of time (about a third of these will be IFR in 1995). Author

N75-29956# Nuclear Regulatory Commission, Washington, D.C. Office of Standards Development.
ENVIRONMENTAL SURVEY OF TRANSPORTATION OF RADIOACTIVE MATERIALS TO AND FROM NUCLEAR POWER PLANTS, SUPPLEMENT 1 Environmental Survey
Apr. 1975 16 p
(PB-241065/2; NUREG-75/038) Avail: NTIS HC $3.25 CSCL 18/4

This supplement presents data and identifies methods used to derive environment impact and risk values on environmental impact of transportation of fuel and waste to and from one light-water-cooled nuclear power reactor. GRA

N75-29957# Grumman Aerospace Corp., Bethpage, N.Y.
TRACKED LEVITATED RESEARCH VEHICLE PERIODIC TEST SUMMARY REPORT: PRIMARY SUSPENSION; AEROPROPELLED Periodic Test Summary Report, Jun. - Aug. 1973
G. Fischer and B. Zapotowski Apr. 1974 163 p refs
(Contract DOT-FR-30041)
(PB-240994/4; PMT-B4-R74-1; FRA-ORD/D-75-28) Avail: NTIS HC $6.25 CSCL 13F

The results of the first tests of the Tracked Levitated Research Vehicle (TLRV) in the guideway at the High Speed Ground Test Center (HSGTC) are presented for the Primary Suspension mode. Air supply system characteristics, cushion performance, acoustic data and vehicle dynamic response behavior are discussed. Acceleration and braking performance are discussed for the speed range from 0 to 68 mph. GRA

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N75-29958*# New Mexico State Univ., Las Cruces. Dept. of Astronomy.
INTERPRETATION OF SURFACE FEATURES OF EUROPA OBTAINED FROM OCCULTATIONS BY Io
A. D. Herzog and R. F. Beebe Mar. 1975 16 p refs Revised
(Grant NGL-32-003-001)
(NASA-CR-143273; TN-74-46-Rev) Avail: NTIS HC $3.25 CSCL 03B

Light curves of occultations of Europa by Io were used to generate a crude map of albedo features on Europa. Impact parameters and magnitude ratios for each event were imposed on a model. Residuals between the observed and computed light curves were interpreted as albedo features on Europa. In order to improve the fit between the observations and the model a general polar brightening was employed. The effects of additional albedo features and alternate models are discussed. Author

N75-29959*# Texas Univ., Austin.
ACCURACY OF SITE COORDINATES OBTAINABLE BY A MOBILE LUNAR LASER STATION Final Report
G. L. Loumos, J. D. Mulholland, P. J. Shelus, and E. C. Silverberg Aug. 1975 44 p refs
(NASA-CR-143052; Rept-75-007) Avail: NTIS HC $3.75 CSCL 03A

The accuracy with which a mobile lunar laser station can be located was the subject of a modeling study. The influence of the number and accuracy of fixed lunar ranging stations, the uncertainty in polar motion, and data loss due to weather and similar factors were considered, and the results are given in a cartographic form. In general, all three coordinates (for coordinates to latitude + or - 60 deg) were determined to better than the pole uncertainty, given three or more fixed sites and reasonable weather. This result indicates that one or more mobile stations would be suitable for the study of geotectonics. Author

N75-29960*# National Aeronautics and Space Administration. Wallops Station, Wallops Island, Va.
FREE RADICAL OH, A MOLECULE OF ASTROPHYSICAL AND AERONOMIC INTEREST
Hari Mohan and Shardanand Washington 1975 90 p refs
(NASA-SP-373) Avail: NTIS HC $4.75 CSCL 03B

The chemistry and physics of the gaseous OH free radical as it applies to interstellar space, planetary atmospheres, and the sun is presented. Topics considered are: (1) rotational-vibrational transitions; (2) dissociation and ionization processes; (3) spectral characteristics. J.R.T.

N75-29961*# Westinghouse Research Labs., Pittsburgh, Pa. Electronic Tube Div.
ELECTRONIC MAGNIFICATION FOR ASTRONOMICAL CAMERA TUBES Final Report
J. Vine, J. R. Hansen, and J. P. Pietrzyk Dec. 1974 144 p refs
(Contract NAS5-20511)
(NASA-CR-143827) Avail: NTIS HC $5.75 CSCL 03A

Definitions, test schemes, and analyses used to provide variable magnification in the image section of the television sensor for large space telescopes are outlined. Experimental results show a definite form of magnetic field distribution is necessary to achieve magnification in the range 3X to 4X. Coil systems to establish the required field shapes were built, and both image intensifiers and camera tubes were operated at high magnification. The experiments confirm that such operation is practical and can provide satisfactory image quality. The main problem with such a system was identified as heating of the photocathode due to concentration of coil power dissipation in that vicinity. Suggestions for overcoming this disadvantage are included. Author

N75-29962*# Massachusetts Inst. of Tech., Cambridge. Dept. of Planetary Sciences.

ANALYSIS OF THE CAPABILITY AND LIMITATIONS OF RELATIVISTIC GRAVITY MEASUREMENTS USING RADIO ASTRONOMY METHODS Final Report, 1 Oct. 1973 - 30 Jun. 1975

Irwin I. Shapiro and Charles C. Counselman, III 30 Jun. 1975 146 p refs

(Contract NAS8-30301)

(NASA-CR-120687) Avail: NTIS HC $5.75 CSCL 03A

The uses of radar observations of planets and very-long-baseline radio interferometric observations of extragalactic objects to test theories of gravitation are described in detail with special emphasis on sources of error. The accuracy achievable in these tests with data already obtained, can be summarized in terms of: retardation of signal propagation (radar), deflection of radio waves (interferometry), advance of planetary perihelia (radar), gravitational quadrupole moment of sun (radar), and time variation of gravitational constant (radar). The analyses completed to date have yielded no significant disagreement with the predictions of general relativity. Author

N75-29963*# Lowell Observatory, Flagstaff, Ariz. Planetary Research Center.

UBV PHOTOMETRY OF ASTEROID 433 EROS

Robert L. Millis, E. Bowell, and D. T. Thompson 18 Aug. 1975 42 p refs

(Grant NGR-03-003-001)

(NASA-CR-143316) Avail: NTIS HC $3.75 CSCL 03A

UBV observations of asteroid 433 Eros were conducted on 17 nights during the winter of 1974/75. The peak-to-peak amplitude of the light curve varied from about 0.3 mag to nearly 1.4 mag. The absolute V magnitude, extrapolated to zero phase, is 10.85. Phase coefficients of 0.0245 mag/degree, 0.0009 mag/degree, and 0.0004 mag/degree were derived for V, B-V, and U-B, respectively. The zero-phase color of Eros (B-V = 0.88, U-B = 0.50) is representative of an S (silicaceous) compositional type asteroid. The color does not vary with rotation. The photometric behavior of Eros can be modeled by a cylinder with rounded ends having an axial ratio of about 2.3:1. Author

N75-29964*# American Science and Engineering, Inc., Cambridge, Mass.

SMALL ASTRONOMY SATELLITE-A, UHURU DATA ANALYSIS Final Report, 12 Dec. 1970 - 31 Dec. 1974

D. Koch 31 Dec. 1974 168 p refs

(Contract NAS5-11422)

(NASA-CR-144660; ASE-3654) Avail: NTIS HC $6.25 CSCL 03A

Objectives were to conduct observations with the first satellite entirely devoted to X-ray astronomy and to analyze the results obtained. A catalog of X-ray sources was generated, and results of discoveries and further detailed observations of sources were presented in scientific journals and meetings. A list of how objectives were met, a brief description of the instrument, significant results, the X-ray catalog, and a complete bibliography of results are included. Author

N75-29965*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

EVALUATION OF THE PRESENT THEORETICAL BASIS FOR DETERMINATION OF PLANETARY SURFACE PROPERTIES BY EARTH-BASED RADAR

Leo D. Staton Washington Aug. 1975 34 p refs

(NASA-TN-D-7889; L-9889) HC $3.75 CSCL 03B

Spaceflight programs such as the planned Viking landing on Mars require the determination of planetary surface slopes and surface dielectric constants by earth-based methods. Heavy reliance is often placed on radar backscattering data for estimation of these surface properties. An assessment is presented of the basic theory by which the raw radar data are interpreted, and it is shown that serious difficulties and internal inconsistencies are present in the available theoretical formulas. The discussion brings into question the reliability of the presently available results for these surface properties as obtained by earth-based radar methods. Author

N75-29966# Cambridge Univ. (England). Inst. of Astronomy.

[ACTIVITIES OF THE INSTITUTE OF ASTRONOMY] Annual Report, period ending 31 Aug. 1974

Aug. 1974 22 p

Avail: NTIS HC $3.25

Observations of galaxies and stars are discussed and theoretical studies concerning galaxies, spiral structure, stars, pulsars, black holes, and the planets are described in detail. ESRO

N75-29967# Owens Valley Radio Observatory, Pasadena, Calif.

OBSERVATIONS WITH A VLB ARRAY. THE SOURCES 3C120, 3C273, 2134 AND 004, AND 3C84, 3

R. T. Schilizzi, M. H. Cohen, J. D. Romney, D. B. Shaffer, and K. I. Kellermann 1975 48 p Prepared in cooperation with Yale Univ. Observatory

(Contract N00014-67-A-0019; Grants NSF GP-30400; NSF GP-19400; NSF GP-8115)

(AD-A005769; Rept-1974-3) Avail: NTIS CSCL 03/2

The sources 3C120, 3C273, 2134-004 and 3C84 were observed at several apochs at 2.8 cm using a multi-element very-long-baseline interferometer. The resulting visibility data show that the brightness distributions of each source are variable. There are large changes in the visibilities of 3C120 and 3C273 on a time scale of months. For 3C120, and perhaps 3C273, the changes can be explained by source distributions in which the components are separating at high (probably relativistic) speeds. GRA

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N75-29968*# Joint Publications Research Service, Arlington, Va.

A COSMIC MODEL OF THE BIOSPHERE

Lyubov Andriyenko Washington NASA Jul. 1975 6 p Transl. into ENGLISH from Radyanska Ukrayina (USSR), 12 Apr. 1975 p 4

(NASA-TT-F-16460) Avail: NTIS HC $3.25 CSCL 03B

An example of a possible closed cycle life support system for space is described and some applications of space research on earth are discussed. Author

N75-29969*# Stanford Univ., Calif. Inst. for Plasma Research.

PULSAR EXTINCTION

P. A. Sturrock, K. Baker, and J. S. Turk Jul. 1975 28 p refs

(Grant NGR-05-020-668)

(NASA-CR-143272; SU-IPR-633) Avail: NTIS HC $3.75 CSCL 03B

Radio emission from pulsars, attributed to an instability associated with the creation of electron-positron pairs from gamma rays was investigated. The condition for pair creation therefore lead to an extinction condition. The relevant physical processes were analyzed in the context of a mathematical model, according to which radiation originated at the polar caps and magnetic field lines changed from a closed configuration to an open configuration at the force balance or corotation radius. Author

N75-29970*# Saad Publications, Karachi (Pakistan).

A COURSE IN PRACTICAL ASTROPHYSICS

D. Ya. Martynov Washington NASA Aug. 1975 850 p Transl. into ENGLISH of the book "Kurs Prakticheskoy Astrofiziki" Moscow, State Publishing House of Phys. and Mathematical Literature, 1960 508 p Sponsored in part by NASA

(Contract NSF C-505)

(NASA-TT-F-15570) Avail: NTIS HC $19.25 CSCL 03B

A text on a course of general astrophysics is presented. The plan of the book and its contents in the general outline corresponds to the program as it is practiced in Moscow University. The theory and practice of photographic processing in astronomy is treated. Other topics include: (1) telescope systems and optics; (2) antennas and radio receivers; (3) cosmic rays and other space particle phenomenon; (4) spectrum analysis and equipment. J.R.T.

N75-29971*# Kanner (Leo) Associates, Redwood City, Calif.
WHY ARE THERE SO FEW X-RAY STARS?
A. F. Illarionov and R. A. Syunyayev Washington NASA Jun. 1975 33 p refs Transl. into ENGLISH from Russian report Pr-202, 1974 p 1-32
(Contract NASw-2481)
(NASA-TT-F-16296; PR-202) Avail: NTIS HC $3.75 CSCL 03B

Conditions are discussed under which a binary star can be converted into a source of X-ray radiation depending on the condition under which stellar wind accretion of matter in the form of a disk can occur on a black hole or neutron star. It is shown that the main condition for the appearance of an X-ray source in a binary system is that the dimensions of its normal component be close to the dimensions of its Roche's cavity. It was found that old isolated pulsars cannot become sources of ultraviolet and soft X-ray radiation. Author

N75-29972# Ohio State Univ., Columbus. Dept. of Geodetic Science.
ADJUSTMENT OF MEAN EARTH ELLIPSOID PARAMETERS
D. P. Hajela Oct. 1974 24 p refs
(Contract F19628-72-C-0120; AF Proj. 8607)
(AD-A006364; DGS-215; SR-20; AFCRL-TR-74-0509) Avail: NTIS CSCL 08/5

The report describes the details of an adjustment technique used to find parameters of a mean earth ellipsoid. The parameters considered include the equatorial radius, geocentric gravitational constant, the flattening, equatorial gravity, and the geoid potential. Various adjustment models are described. The linearized observation equations are formed and the specific adjustment procedure is given. The procedure used incorporates apriori estimates of quantities determined from satellite and gravimetric data. GRA

N75-29973# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
TABLES OF NON-VERTICAL CUTOFF RIGIDITIES FOR 76 VARIOUS LOCATIONS Environmental Research Papers
M. A. Shea, D. F. Smart, J. R. McCall, and B. S. Gumm 30 Dec. 1974 30 p refs
(AF Proj. 8600)
(AD-A006397; AFCRL-ERP-497; AFCRL-TR-75-0008) Avail: NTIS CSCL 08/14

Tables of non-vertical cutoff rigidities calculated using the trajectory-tracing technique are given for 76 various locations. These calculations were made using the Finch and Leaton magnetic field coefficients appropriate for Epoch 1955. Each table includes the geographic coordinates and L value of each location, the zenith and azimuth angles for which the calculations were made, and the main cone cutoff rigidity, the Stormer cutoff rigidity, and the effective cutoff rigidity. GRA

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N75-29974*# Massachusetts Inst. of Tech., Cambridge. Dept. of Earth and Planetary Sciences.
CHEMICAL, MINERALOGICAL AND TEXTURAL SYSTEMATICS OF NON-MARE MELT ROCKS: IMPLICATIONS FOR LUNAR IMPACT AND VOLCANIC PROCESSES
Anthony J. Irving 10 Jun. 1975 83 p refs
(Grant NsG-7081)
(NASA-CR-143285) Avail: NTIS HC $4.75 CSCL 03B

Based on a synthesis of chemical data for over 200 samples, the nonmare rocks with fine grained melt textures can be classified into 7 major groups: anorthositic basalts, troctolitic basalts, VHA basalts, Apollo 14-type KREEP basalts, Apollo 15-type KREEP basalts, Apollo 17-type KREEP basalts, and aluminous mare basalts. Review of chemical, mineralogical, textural and experimental evidence leads to preferred hypotheses for the origins of these rocks; those hypotheses are discussed in detail. Author

N75-29975# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
JUPITER ORBITER. STUDY OF CRITICAL ASPECTS OF A JOINT ESA/NASA PROJECT
Dec. 1974 195 p
(Contract ESRO-SC/45-HQ)
(MBB-UR-V-77-74; ESRO-CR(P)-639) Avail: NTIS HC $7.00

NASA would refurbish, test, and, provide ESA with the Pioneer H spacecraft with a new radioisotope thermoelectric generator, and ESA would convert this spacecraft into an orbiter to map the Jovian atmosphere. The study specifications and mission philosophies are described including the definition of a retro propulsion unit based on the 400 N Symphonie system, and scientific objectives on probe and atmosphere measurement, magnetosphere research, and Jovian satellite encounters as Amalthea, Ganymede, and Callisto. Spacecraft concepts, launch conditions, transfer trajectory, and arrival geometry are described. ESRO

N75-29976*# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
EFFECT OF YAW ANGLE ON STEERING FORCES FOR THE LUNAR ROVING VEHICLE WHEEL Final Report
Andrew J. Green Oct. 1974 63 p ref Sponsored by NASA
(NASA-CR-143290; AD-A006518; AEWES-TR-M-71-7) Avail: NTIS HC $4.25 CSCL 22/1

A series of tests was conducted with a Lunar Roving Vehicle (LRV) wheel operating at yaw angles ranging from -5 to +90 deg. The load was varied from 42 to 82 lb (187 to 365 N), and the speed was varied from 3.5 to 10.0 ft/sec (1.07 to 3.05 m/sec). It was noted that speed had an effect on side thrust and rut depth. Side thrust, rut depth, and skid generally increased as the yaw angle increased. For the range of loads used, the effect of load on performance was not significant. GRA

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N75-29977*# Harvard Coll. Observatory, Cambridge, Mass.
THEORETICAL AND EXPERIMENTAL STUDIES IN ULTRAVIOLET SOLAR PHYSICS Semiannual Status Report, 1 Jun. - 30 Jun. 1975
W. H. Parkinson and E. M. Reeves 30 Jun. 1975 20 p refs
(Grant NGL-22-007-006)
(NASA-CR-143270; SASR-25) Avail: NTIS HC $3.25 CSCL 03B

The processes and parameters in atomic and molecular physics that are relevant to solar physics are investigated. The areas covered include: (1) measurement of atomic and molecular parameters that contribute to discrete and continous sources of opacity and abundance determinations in the sun; (2) line broadening and scattering phenomena; and (3) development of an ion beam spectroscopic source which is used for the measurement of electron excitation cross sections of transition region and coronal ions. Author

N75-29978*# Washington Univ., St. Louis, Mo. Dept. of Electrical Engineering.
DEVELOPMENT OF SOLAR WIND SHOCK MODELS WITH TENSOR PLASMA PRESSURE FOR DATA ANALYSIS Final Technical Report, 1 Aug. 1970 - 31 Dec. 1975
Barbara Abraham-Shrauner 31 Dec. 1975 13 p refs
(Grant NGL-48-008-057)
(NASA-CR-143301) Avail: NTIS HC $3.25 CSCL 03B

The development of solar wind shock models with tensor plasma pressure and the comparison of some of the shock models with the satellite data from Pioneer 6 through Pioneer 9 are reported. Theoretically, difficulties were found in non-turbulent fluid shock models for tensor pressure plasmas. For microscopic

shock theories nonlinear growth caused by plasma instabilities was frequently not clearly demonstrated to lead to the formation of a shock. As a result no clear choice for a shock model for the bow shock or interplanetary tensor pressure shocks emerged. Author

N75-29979*# Scientific Translation Service, Santa Barbara, Calif.
TRANSFORMATION IN THE ATMOSPHERE OF SOLAR RADIATION REFLECTED FROM THE OCEAN
M. S. Malkevich, L. G. Istomina, and V. Nordberg Washington NASA Jul. 1975 33 p refs Transl. into ENGLISH from an unpublished Russian report
(Contract NASw-2791)
(NASA-TT-F-16487) Avail: NTIS HC $3.75 CSCL 03B

Data from measurements of the spectra of reflected solar radiation over the Atlantic Ocean during the tropical experiment TROPEKS-72 are analyzed. The contribution of the atmosphere to the total brightness of the ocean-atmosphere system is evaluated. Author

N75-29980*# Scientific Translation Service, Santa Barbara, Calif.
SPECTRAL STRUCTURE OF THE FIELD OF SOLAR RADIATION REFLECTED BY THE OCEAN-ATMOSPHERE SYSTEM
M. S. Malkevich, L. G. Istomina, and V. Nordberg Washington NASA Jul. 1975 33 p refs Transl. into ENGLISH from an unpublished Russian report
(Contract NASw-2791)
(NASA-TT-F-16488) Avail: NTIS HC $3.75 CSCL 03B

Data are given on the mean spectral distributions of reflected solar radiation of the ocean atmosphere system and the incident radiation at 0.3 and 10 km. These data are subjected to statistical processing, and the results of this processing are analyzed. Author

N75-29981# Academy of Athens (Greece).
ON A COMPARISON BETWEEN THE PREDICTED AND THE OBSERVED VALUES OF THE DIFFERENT INDICES OF SOLAR ACTIVITY FOR THE 20TH SOLAR CYCLE
C. Poulakos 1973 11 p refs
Avail: NTIS HC $3.25

Attempts made to predict solar activity and correlate the different indices of such activity with terrestrial phenomena are summarized. It was noted that only one prediction method, Xanthakes, was satisfactory; however, no satisfactory method for predicting dates and intensities of activity cycles was developed. No accepted physical theory of solar disturbances and no agreement on the best index of solar activity was found. E.H.W.

N75-29982# Academy of Athens (Greece).
PHOTOMETRIC RESEARCH FOR THE K2, 3 CHROMOSPHERIC FLOCCULI
Constantin J. Macris 1974 23 p refs
Avail: NTIS HC $3.25

The photometric study of the small emission centers of the K2,3 solar chromosphere (flocculi), based on a series of spectroheliograms of the Arcetri Observatory, enabled to be estimated the mean value of the intensity of the flocculi (If1(0)) relative to the mean value of the intensity of the chromospheric background at the center of the solar disk (Ichr(0)). The ratio If1(0)/Ichr(0), after the appropriate correction was found to be 1,482 plus or minus 0,003. The measurements at distance sin theta = 0.8 from the center of the solar disk on the equatorial and polar radii showed that the difference, of the ratio If1/Ichr, is significant. If this difference is not due to an error of the Arcetri spectroheliograph, it might be due to a physical reason. Author

N75-29983# Athens Univ. (Greece). Electronic Div.
SIMULTANEOUS OBSERVATION OF TEC FROM NORTH AND SOUTH HEMISPHERE DURING THE 30TH JUNE 1973 SOLAR ECLIPSE Interim Scientific Report No. 1, 1 May 1972 - 30 Apr. 1973
Michael A. Anastassiadis Jun. 1974 9 p refs
(Grant AF-AFOSR-2347-72; AF Proj. 4643)
(AD-A006201; AFCRL-TR-75-0015) Avail: NTIS CSCL 04/1

Simultaneous measurements of Total Electron Count (TEC) of the ionosphere from two magnetic conjugate point during the solar eclipse of 30th June 1973 were performed. The maximum change of TEC at Athens was approximately 7%. At Salisbury this change was more pronounced. The vertical incidence ionosonde measuring the critical freq. for the E, F1 and F2 layer showed no change in the maximum density of the layers. GRA

N75-29984# California Univ., Riverside. Inst. of Geophysics and Planetary Physics.
A LABORATORY SOLAR FLARE NEUTRAL POINT EXPERIMENT Final Report, 7 Sep. 1971 - 6 Dec. 1974
R. S. White, P. J. Baum, and A. Bratenahl Jan. 1975 177 p refs
(Grant AF-AFOSR-2186-72)
(AD-A005821; AFOSR-75-0163TR; IGPP-UCR-75-1) Avail: NTIS CSCL 03/2

Contents: Experimental studies of the reconnection process; admittance probe measurements in the double inverse pinch device; X-ray and electron spectra from the double inverse pinch device; plasma instability at an x-type magnetic neutral point; experimental study of the reconnection process; mass motion and heating in a magnetic neutral point system; spectrum of turbulence at a magnetic neutral point; effect of obstacles on the rate of reconnection of magnetic field lines; impulsive flux transfer events and solar flares; confinement by a triple inverse pinch. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N75-29985*# Texas A&M Univ., College Station. Dept. of Physics.
MULTIPLE SCATTERED RADIATION EMERGING FROM CONTINENTAL HAZE LAYERS. 2: ELLIPTICITY AND DIRECTION OF POLARIZATION
Gilbert N. Plass, George W. Kattawar, and Stephen J. Hitzfelder 11 Aug. 1975 27 p refs Submitted for publication
(Grant NGR-44-001-117)
(NASA-CR-143284; Rept-19) Avail: NTIS HC $3.75 CSCL 03B

The ellipticity and the direction of polarization are calculated for radiation that has undergone multiple scattering from plane parallel layers. Both the radiation emerging from the top of the layer and that transmitted through the bottom are considered. Two different phase functions are used for the scattering layer: Rayleigh and haze L. The direction of polarization of the reflected radiation shows little variation as the optical depth of the layer increases, while there is a much larger variation for the transmitted radiation. When the optical thickness is small, the direction of polarization for haze L varies rapidly with zenith angle near those angles at which the single scattered polarization is zero. The ellipticity of the radiation from haze L layers increases at first in direct proportion to the optical thickness of the layer. In general the ellipticity of the transmitted radiation is considerably greater than that of the reflected because of the greater average number of photon collisions in the former case. Author

N75-29986*# Teledyne Brown Engineering, Huntsville, Ala. Research Dept.
CALCULATIONS FOR INTERPRETATION OF SOLAR VECTOR MAGNETOGRAPH DATA Final Report, Oct. 1970 - May 1975
A. R. Dunn May 1975 164 p refs
(Contract NAS8-26376)
(NASA-CR-120685; EE-MSFC-1900) Avail: NTIS HC $6.25 CSCL 03B

Computer techniques for data analysis of sunspot observations are presented. Photographic spectra were converted to digital form and analyzed. Methods of determining magnetic field strengths, i.e., the Zeeman effect, are discussed. Errors originating

with telescope equipment and the magnetograph are treated. Flow charts of test programs and procedures of the data analysis are shown. J.R.T.

N75-29987# Lund Univ. (Sweden). Dept of Physics.
WIDTH MEASUREMENTS ON SHORT TRACKS OF COSMIC RAY NUCLEI IN NUCLEAR EMULSION
Gilbert Joensson Oct. 1974 27 p refs Sponsored by Swed. Nat. Sci. Res. Council
(LUIP-CR-74-13) Avail: NTIS HC $3.75

Measurements were made on tracks of 100 stopping particles of known nuclear charges Z 5 to 26 in G5 emulsion in the residual range interval R between 0 and 400 micrometers. The widths were measured with a filar micrometer according to a special pattern of measurement. The mean track widths in microns were calculated as a function of residual range and nuclear charge. A comparison was made between measured and theoretical track widths. The charge resolution of the measuring technique was estimated. Within the charge groups 5 to 8, 10 to 14, and 24 to 26 the standard deviation of the charge determination amounts to 0.4, 0.8, and 1.8 units of charge, respectively, when the measurements are made on the last 100 micrometers residual range and a straightforward sum of the measured widths is used as the charge parameter.
Author (ESRO)

99 GENERAL

N75-29988# European Space Research Organization, Paris (France).
AEROSPACE RESEARCH. BI-MONTHLY BULLETIN NO. 1974-1
Mar. 1975 168 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 1-68
(ESRO-TT-144) Avail: NTIS HC $6.25; ONERA, Paris 20 F

An attempt is made to determine, within the framework of a study of the pogo effect, the combustion scheme most suited to the representation of the transfer function of the combustion chamber. The first results of an investigation into the unsteady behavior of hydraulic systems, such as propellant feed systems, with a view to determining pogo effects are presented. An experimental device was constructed for the examination of the mixing and combustion process in a force field induced by a swirling flow. Tests which resulted in the introduction of molten aluminum between nickel coated carbon fibers are described. It is pointed out that the conservative form of a system of equations can be preserved after an arbitrary transformation of the coordinates has occurred dependent upon time. An analog signal spectral analysis unit is described, permitting aerodynamic percussion analysis. For individual titles, see N75-29989 through N75-29994.

N75-29989 European Space Research Organization, Paris (France).
INFLUENCE OF COMBUSTION PHENOMENA ON THE POGO EFFECT c20
M. Barrere, J. Bouttes, and J. J. Dordain *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 1-47 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 1-21 Submitted for publication (For availability see N75-29988 20-99)

Attention was paid to the representation of phenomena resulting from concentrated combustion. It is shown that the influence of combustion on the pogo effect depends on the scale effect; the importance of the model chosen decreases as the thrustor power increases. The introduction of a combustion delay time is necessary when the characteristics time is greater than the dwell time of the gases in the duct. Assuming that the delay varies with fluctuations in the combustion chamber pressure and the mass flow rate injected into the chamber, this latter parameter plays a very important role in a study of the system stability. With two liquids, it is necessary to introduce two delay times, one corresponding to the evolution of the oxidizer, while the other corresponds to the evolution of the fuel.
Author (ESRO)

N75-29990 European Space Research Organization, Paris (France).
TRANSFER MATRICES OF HYDRAULIC SYSTEMS. THEORETICAL AND EXPERIMENTAL STUDY c20
Jean-Jacques Dordain and Michel Marchetti *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 48-84 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 23-35 Presented at the French Mech. Eng. Congr., Poitiers, 17-20 Sep. 1973 (For availability see N75-29988 20-99)

Results are presented for an investigation into the unsteady behavior of hydraulic systems, such as propellant feed systems with a view to determining pogo effects. Each hydraulic system is characterized by its own transfer matrix. Transfer matrices are examined analytically for general properties, theoretical expression for simple configurations, and numerical approach. The means of testing and measuring are described. Results obtained on a rectilinear cylindrical pipe are presented.
Author (ESRO)

N75-29991 European Space Research Organization, Paris (France).
EXAMINATION OF COMBUSTION STABILITY IN A SWIRLING FLOW COMBUSTION CHAMBER c07
Andre Benoit, Gerard Collin, and Andre Mestre *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 85-114 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 37-48 (For availability see N75-29988 20-99)

An experimental device was constructed for the examination of the mixing and combustion process in a force field induced by a swirling flow. The chamber made for this purpose provides a stable operation with high efficiency (complete combustion and low pollution) in a small volume and can be used as the primary zone of a combustion chamber for a small gas turbine engine.
Author (ESRO)

N75-29992 European Space Research Organization, Paris (France).
PROCESSING COMPOSITE MATERIALS WITH A METALLIC MATRIX c24
Rene Lignon *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 115-152 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 49-63 (For availability see N75-29988 20-99)

Tests are described which resulted in the introduction of molten aluminum between nickel coated carbon fibers. The nickel which coats the fibers enters the aluminum in solution and lowers the melting point. The liquid metal phase thus produced completely wets the fibers. This procedure in which a wet interface is formed by dissolving a surface deposit can be extended to a wide range of applications. Characteristics of the elements to be used are given. Several examples are given for processing composite materials with an aluminum base matrix. A major improvement consists in using a colloidal suspension in order to produce the initial surface deposit.
Author (ESRO)

N75-29993 European Space Research Organization, Paris (France).
CONSERVATION FORMS OF GAS DYNAMIC EQUATIONS c34
Henri Viviand *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 153-159 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 65-66 (For availability see N75-29988 20-99)

It is pointed out that the conservative form of a system of equations can be preserved after an arbitrary transformation of the coordinates has occurred dependent upon time. A simple general transformation formula is described which is suitable for calculating unsteady transonic flows around moving nonuniform or distorting obstacles cases.
ESRO

N75-29994 European Space Research Organization, Paris (France).

A NEW TRANSIENT SIGNAL ANALYSIS UNIT **c09**

Michel Mathurin and Claude Christoux *In its* Aerospace Research, Bi-monthly Bull. No. 1974-1 (ESRO-TT-144) Mar. 1975 p 160-165 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), no. 1974-1, Jan.-Feb. 1974 p 67-68 (For availability see N75-29988 20-99)

An analog signal spectral analysis unit is described which enables fast measurement of the dynamic characteristics (frequency, damping) of the response of a structure undergoing a percussional excitation. The unit consists mainly of a magnetic disk, controlled electronically by means of a slotted tachometric ring. The magnetic head is suspended on an air cushion. ESRO

N75-29995# Southampton Univ. (England).

[ACTIVITIES OF THE INSTITUTE OF SOUND AND VIBRATION RESEARCH] Annual Report, Apr. 1973 - Mar. 1974

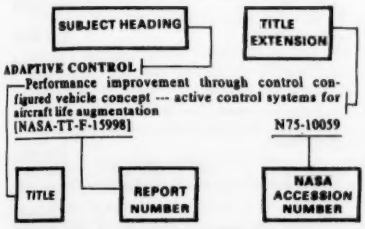
Mar. 1974 42 p

Avail: NTIS HC $3.75

These activities are in the fields of acoustics and fluid dynamics, automotive engineering, operational acoustics and audiology, and structural dynamics. A special group deals with noise and vibration control. ESRO

SUBJECT INDEX

TYPICAL SUBJECT INDEX LISTING



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7040).

A

ABSORPTION
Method and apparatus for background signal reduction in opto-acoustic absorption measurement
[NASA-CASE-NPO-13683-1] N75-29383
ABSORPTION SPECTRA
Study of water absorption lines in the near infrared
[AD-A005636] N75-29234
Atmospheric measurements at millimeter wavelengths
[AD-A006128] N75-29626
ABSORPTIVITY
Normal incidence absorption coefficients and acoustic impedances of single layer perforated sheet liners
[ESDU-74004] N75-29868
ACCELERATED LIFE TESTS
Predictive distributions in life tests under competing causes of failure
[RR-166/GAB/IRD/1] N75-29450
ACCELERATION [PHYSICS]
G-load measuring and indicator apparatus
[NASA-CASE-ARC-10806-1] N75-29381
ACCELERATION PROTECTION
The plus Gz protective methods for use in advanced fighter-attack aircraft
N75-29727
ACCELEROMETERS
An evaluation of magnetic mounting of accelerometers
[AD-A005735] N75-29396
ACOUSTIC DELAY LINES
Acoustic signal processing devices [surface wave transducer study]
[AD-A006257] N75-29335
ACOUSTIC DUCTS
Normal incidence absorption coefficients and acoustic impedances of single layer perforated sheet liners
[ESDU-74004] N75-29868
ACOUSTIC IMPEDANCE
Normal incidence absorption coefficients and acoustic impedances of typical single layer fibrous lining materials --- fibermetals and polyimide laminates
[ESDU-74003] N75-29185
Normal incidence absorption coefficients and acoustic impedances of single layer perforated sheet liners
[ESDU-74004] N75-29868
ACOUSTIC MEASUREMENTS
Audible and ultrasonic acoustic emissions from composite solid propellants
[AD-A005714] N75-29268
Evaluation of an acoustical X-Y digitizer for use in biomedical data reduction tasks
[AD-A005293] N75-29746
ACOUSTIC PROPERTIES
Trends in aircraft noise control
N75-29008
ACOUSTIC SCATTERING
Preliminary results of acoustic echo sounding of the marine boundary layer during GATE
N75-29665
ACOUSTIC VELOCITY
Microwave acoustics handbook. Volume 2: Surface wave velocities, numerical data
[AD-A006113] N75-29870
ACOUSTICAL HOLOGRAPHY
Solid rocket motor inspection by acoustical holography techniques
[AD-A006236] N75-29179
ACOUSTICS
Survey of sonic boom phenomena for the non-specialist --- sound wave propagation
[AD-A009663] N75-29113
Activities of the Institute of Sound and Vibration Research
N75-29995
ACRYLONITRILES
Engineering and cost study of air pollution control for the petrochemical industry. Volume 2: Acrylonitrile manufacture
[PB-240986/0] N75-29599
ACTUATORS
F-89 hydraulic actuator combinatorial geometric representation
[AD-A006435] N75-29101
Cyclical bi-directional rotary actuator
[NASA-CASE-GSC-11883-1] N75-29430
ADDITIVES
Admixtures in germanium, silicon and gallium arsenide recombination characteristics
[AD-A006097] N75-29929
ADHESIVES
Polyimide adhesives
[NASA-CASE-LAR-11397-1] N75-29263
ADSORPTION
Water and vinyl trichlorosilane vapor interactions with E-glass fibers
[AD-A005088] N75-29218
ADSORPTIVITY
Work function and adsorption properties of yttrium group rare earth metals
[AD-A005979] N75-29922
AERIAL PHOTOGRAPHY
A study to analyze six band multispectral images and fabricate a Fourier transform detector --- optical data processing - aerial photography/forests
[NASA-CR-120684] N75-29388
Application of the helicopter KA-26 to large-scale aerial photography
[AD-A005950] N75-29393
AERIAL RECONNAISSANCE
The low-level structure of an African disturbance determined by aircraft reconnaissance --- compared with satellite IR photography
N75-29640
AERODYNAMIC CHARACTERISTICS
Numerical simulation of flame induced aerodynamics in a coal-mine passageway, semi-empirical model
[PB-240843/3] N75-29379
AERODYNAMIC COEFFICIENTS
Effects of Reynolds number and roughness on C sub Lmax --- aerodynamic characteristics of airfoil
[NAL-TR-396] N75-29026
Extraction from flight data of longitudinal aerodynamic coefficients in maneuvering flight for F-8C aircraft
[NASA-TN-D-8019] N75-29039
AERODYNAMIC DRAG
Opportunities for aerodynamic-drag reduction
N75-29016
Information on the use of data items in the series bodies 02.04
[ESDU-02.04.00] N75-29028
The prediction of boundary-layer behavior and profile drag for infinite yawed wings. Part 2: Flow near a turbulent attachment line
[ARC-CP-1308] N75-29043
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 1: A method of calculation
[ARC-CP-1307-PT-1] N75-29046
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 3: Calculations for a particular wing
[ARC-CP-1309-PT-3] N75-29047
Thrust/drag analysis for a front fan nacelle having two separate co-axial exhaust streams --- for turbofan engines
[ARC-CP-1311] N75-29049
AERODYNAMIC HEAT TRANSFER
Bulk aerodynamic description of turbulent fluxes at the surface with and without precipitation --- air water interactions
N75-29668
AERODYNAMIC HEATING
Crack growth in Ti-8Al-1Mo-1V with real-time and accelerated flight by flight loading
[NASA-TM-X-72754] N75-29092
AERODYNAMIC INTERFERENCE
Measurement and analysis of unsteady aerodynamic force for the vertical gust on an airplane model in the NAL gust wind tunnel --- swept wing interference tests
[NAL-TR-399] N75-29027
Experimental and theoretical investigations on the problem of propeller/wing interference up to high angles of attack
[NASA-TT-F-16490] N75-29035
The effect of a pylon-mounted nacelle on the flutter behaviour of a wing-pylon-nacelle configuration
[NLR-TR-74125-U] N75-29056
AERODYNAMIC LOADS
The computation of aerodynamic loads on helicopter blades in forward flight, using the method of the acceleration potential
[VTH-189] N75-29055
A new transient signal analysis unit --- aerodynamic percussion analysis using magnetic disk unit
N75-29994
AERODYNAMIC NOISE
Trends in aircraft noise control
N75-29008
AERODYNAMIC STALLING
The effect of compressibility on unstalled torsional flutter
[ARC-R/M-3754] N75-29040
AERODYNAMICS
Unsteady vortex lattice techniques applied to wake formation and performance of the statically thrusting propeller
[NASA-CR-132686] N75-29031
AEROELASTICITY
The effect of a pylon-mounted nacelle on the flutter behaviour of a wing-pylon-nacelle configuration
[NLR-TR-74125-U] N75-29056
AERONAUTICAL ENGINEERING
NASA/University Conference on Aeronautics
[NASA-SP-372] N75-29001
Aeronautics in the American Society
N75-29002
Some developing concepts of engineering education
N75-29003
Current and future opportunities in aeronautical engineering
N75-29004
The predicament of aeronautical engineering education and what we can do about it
N75-29005
The predicament of aeronautical engineering education and what we can do about it
N75-29006
The ME/DE degree at the University of Kansas
N75-29017
A proposed university/industry/government cooperative aero educational program
N75-29018
University/government/industry relations in aeronautics
N75-29019
University research in aeronautics
N75-29020
General aviation's future need for research
N75-29021
University research in aeronautics
N75-29022
Curriculum for modern aeronautics
N75-29023

Engineering education for the 1980's: A speculation N75-29024
What kind of students should be developed through aeronautical engineering education? N75-29025
AERONAUTICAL SATELLITES
Aeronautical satellite [AEROSAT] program related bibliography
[AD-A005987] N75-29154
AEROSOLS
Aerosol and water vapour influences on direct solar radiation fluxes in the centre of equatorial Atlantic N75-29672
On the relation between optical and aerosol characteristics of the east Atlantic atmosphere N75-29673
Radiation scattering by atmospheric aerosols
[AD-A006081] N75-29889
AEROSPACE ENVIRONMENTS
The study of single crystals for space processing and the effect of zero gravity
[NASA-CR-143271] N75-29914
AEROSPACE MEDICINE
Current status in aerospace medicine --- conference on habitability of spacecraft environments and environmental control
[AGARD-CP-154] N75-29722
A summary of Skylab findings of interest to life scientists N75-29725
The aircrewman at increased risk of ischemic vascular disease N75-29728
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 142
[NASA-SP-7011[142]] N75-29735
AEROSPACE SYSTEMS
Approximation of complex aerospace systems by simpler ones
[AD-A006466] N75-29859
AFRICA
The low-level structure of an African disturbance determined by aircraft reconnaissance --- compared with satellite IR photography N75-29640
Study of the A- and B-scale disturbances propagating across the African continent N75-29641
Cloud cluster formation over monsoon Africa N75-29649
Infrared radiation budget of the Harmattan haze --- West Africa N75-29674
AFTERBURNING
A fully coupled underexpanded afterburning rocket plume program [the AIPP code]. Part 1: Analytical and numerical techniques
[AD-A006235] N75-29180
AGING [MATERIALS]
The development of an automatic multisample isothermal aging apparatus
[AD-A006156] N75-29232
Method of heat treating age-hardenable alloys
[NASA-CASE-XNP-01311] N75-29236
AGRICULTURE
Investigation of Skylab data --- Locke Township, Ingham County, Michigan
[E75-10363] N75-29505
Detection of crop mark contrast for archaeological surveys --- Great Britain
[E75-10364] N75-29506
Ohio Skylab EREP investigation
[E75-10365] N75-29507
Recognition map analysis and crop acreage estimation using Skylab EREP data --- Michigan
[E75-10366] N75-29508
Recognition map analysis and crop acreage estimation using Skylab EREP data --- Michigan
[E75-10369] N75-29511
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
Ohio Skylab EREP investigation
[E75-10373] N75-29515
Recognition map analysis and crop acreage estimation
[E75-10375] N75-29517
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
Recognition map analysis and crop acreage estimation
[E75-10380] N75-29522
World climate and world food systems 3: The lessons of climatic history
[PB-240872/2] N75-29691
World climate and world food systems 4: A survey of the state of the art in meteorological long range statistical forecasting
[PB-240873/0] N75-29692
World climate and world food systems 5: The special model; history and present state of the art
[PB-240874/8] N75-29693
Economic impact of shortages on the fertilizer industry
[PB-240418/4] N75-29953
AIR
Fretting of titanium at temperatures to 650 C in air
[NASA-TN-D-8048] N75-29250
AIR CONDITIONING
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240784/9] N75-29552
Newest methods of air distribution in conditioning systems on naval transport vessels
[NASA-TT-F-16498] N75-29775
Status and prospects for the development of air conditioning for naval vessels
[NASA-TT-F-16457] N75-29777
AIR FLOW
Investigation of the flows flowing from swirlers, 1
[NAL-TR-376] N75-29105
AIR INTAKES
Technical evaluation report on fluid dynamics panel symposium on Airframe/Propulsion --- a discussion of air intakes, nozzle flow, and flow distribution
[AGARD-AR-81] N75-29114
AIR NAVIGATION
Evaluation of a very low frequency navigation system
[AD-A005043] N75-29074
AIR POLLUTION
Assessing and controlling the effect of aircraft on the environment: Pollution N75-29009
Development of tunable semiconductor lasers for application to air pollution measurements
[PB-241030/6] N75-29423
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
The control of nitrogen oxide emission from stationary sources
[BLL-RTS-9849] N75-29571
Airport vicinity air pollution study: The impact of modified aircraft taxi procedures on airport air quality
[AD-A009882] N75-29572
Background information for standards of performance: Electric submerged arc furnaces for production of ferroalloys. Volume 1: Proposed standards
[EPA-450/2-74-018A] N75-29573
WMO operations manual for sampling and analysis techniques for chemical constituents in air and precipitation. Part 1: The minimum programme at regional air-pollution stations. Part 2: Guidelines for baseline stations and regional stations with extended programmes
[WMO-299] N75-29574
USAF aircraft pollution emission factors and landing and takeoff LTO cycles
[AD-A006239] N75-29582
Sulfate control technology assessment. Phase 1: Literature search and analysis
[PB-240995/1] N75-29589
The macroeconomic impacts of federal pollution control programs
[PB-240979/5] N75-29591
Report to Congress on control of sulfur oxides
[PB-241021/5] N75-29597
Engineering and cost study of air pollution control for the petrochemical industry. Volume 2: Acrylonitrile manufacture
[PB-240986/0] N75-29599
The effects of air and water pollution controls on solid waste generation, 1971 - 1985. Executive summary
[PB-240739/2] N75-29600
Determination of the feasibility of the long-range transport of ozone or ozone precursors
[PB-241159/3] N75-29617
AIR SEA ICE INTERACTIONS
The components of the energy balance of the atmosphere and underlying surface in the northern polar regions
[BLL-M-23619-[5828.4F]] N75-29601
AIR TRAFFIC
Study to develop regional and nation-wide estimates of General Aviation [GA] activity at non-towered airports
[AD-A009883] N75-29062
Statistical summary of the 1983 Los Angeles enroute center standard traffic model
[AD-A009011] N75-29073
AIR TRAFFIC CONTROL
An overview of the FAA engineering and development programs with highlights of fiscal years, 1975-1976 --- progress in aircraft safety, instrument landing systems, radar navigation, and air traffic control
[AD-A010266] N75-29063
Discrete address beacon system/air traffic control interface configuration document. Volume 2: Enroute hardware for phase I
[AD-A009307] N75-29081
Simulation model for New York air traffic control communications
[AD-A006426] N75-29083
Advanced air traffic management system study: Technical summary
[PB-241223/7] N75-29086
GOSPRE: A simple analytical program for computing grade of service in a heavily loaded communications network
[SRDE-74018] N75-29301
Simulation of large-scale dynamic systems N75-29846
Air traffic demand estimates for 1995
[PB-241083/] N75-29955
AIR TRANSPORTATION
The next forty years in aviation N75-29007
Litter enplaning-deplaning device
[AD-A006137] N75-29754
Air traffic demand estimates for 1995
[PB-241083/] N75-29955
AIR WATER INTERACTIONS
One feature of long term ocean-atmosphere interaction
[BLL-M-23693-[5828.4F]] N75-29633
Bulk aerodynamic description of turbulent fluxes at the surface with and without precipitation --- air water interactions N75-29668
On some questions of interaction between the Ocean and atmosphere in the northern part of A/B scale N75-29682
Spatial and temporal variations of the turbulent fluxes of heat, momentum, and water vapor over Lake Ontario during IFYCL
[COM-75-10481/0] N75-29700
AIRBORNE EQUIPMENT
Short-pulse switches for airborne high-power supplies
[AD-A006107] N75-29340
Airborne meteorological instrumentation system and data reduction
[AD-A009665] N75-29636
AIRCRAFT ACCIDENTS
Vortex-related accidents over the ten year period 1964 - 1973
[AD-A010111] N75-29065
AIRCRAFT ANTENNAS
DABS link performance considerations
[AD-A009429] N75-29078
An analysis of aircraft L-band beacon antenna patterns
[AD-A005569] N75-29287
AIRCRAFT COMMUNICATION
GOSPRE: A simple analytical program for computing grade of service in a heavily loaded communications network
[SRDE-74018] N75-29301
AIRCRAFT CONTROL
Status and trends in active control technology N75-29015
Longitudinal motions of aircraft involving high angles of attack
[ARC-R/M-3753] N75-29094
AIRCRAFT DESIGN
NASA/University Conference on Aeronautics
[NASA-SP-372] N75-29001
Aeronautics in the American Society N75-29002
Some trends in aircraft design: Structures N75-29014
Status and trends in active control technology N75-29015
Theoretical effect of modifications to the upper surface of two NACA airfoils using smooth polynomial additional thickness distributions which emphasize leading edge profile and which vary linearly at the trailing edge
[NASA-CR-137717] N75-29030
On an airplane in outer space --- technology transfer between aircraft design and spacecraft design
[NASA-TT-F-16423] N75-29087
AIRCRAFT ENGINES
Assessing and controlling the effect of aircraft on the environment: Pollution N75-29009
Aircraft engine speed and fuel flow signal conditioner with digital output
[ARL/ME-NOTE-354] N75-29111
Calculation of aircraft engine turbines. [Gasdynamic calculation: Blade profiling]
[NASA-TT-F-16367] N75-29120
Digital fuel controller for lift jet engine
[NAL-TR-389] N75-29122
AIRCRAFT EQUIPMENT
Airborne electronics for automated flight systems N75-29011
General aviation's future need for research N75-29021
Firebird interferometer --- for observation of infrared plume emission
[AD-A005815] N75-29395
AIRCRAFT FUELS
The long term energy problem and aeronautics N75-29012

AIRCRAFT GUIDANCE
Intermittent positive control computer algorithm for test bed experiments --- collision avoidance - aircraft guidance
[AD-A009215] N75-29068
Further studies of ATCRBS based on ARTS-3 derived data --- aircraft guidance - digital data/data correlation
[AD-A005568] N75-29079
Flight control and the effectiveness of an aviation system
[NASA-TT-F-16262] N75-29126
Digital flight control system redundancy study --- fly by wire control - aircraft guidance
[AD-A006411] N75-29129
AIRCRAFT INDUSTRY
Current and future opportunities in aeronautical engineering
N75-29004
AIRCRAFT INSTRUMENTS
Results of an aircraft visibility questionnaire concerned with the estimated benefits of airborne proximity warning indicator systems
[AD-A009884] N75-29061
Data link short-message cockpit display test
[AD-A005988] N75-29285
G-load measuring and indicator apparatus
[NASA-CASE-ARC-10806-1] N75-29381
AIRCRAFT LANDING
A computer program for rigid pavement evaluation
[AD-A006140] N75-29496
AIRCRAFT MAINTENANCE
Training of enlisted women as jet aircraft maintenance specialists
[AD-A006434] N75-29771
AIRCRAFT MANEUVERS
Extraction from flight data of longitudinal aerodynamic coefficients in maneuvering flight for F-8C aircraft
[NASA-TN-D-8019] N75-29039
G-load measuring and indicator apparatus
[NASA-CASE-ARC-10806-1] N75-29381
AIRCRAFT MODELS
Free-flight model dynamic stability measurements on a not-so-slender wing/fin combination at zero and small lift, Mach number equals 0.8 to 2.0
[ARC-CP-1315] N75-29051
User's guide for a revised computer program to analyze the LRC 16 foot transonic dynamics tunnel active cable mount system --- computer techniques - aircraft models
[NASA-CR-132692] N75-29130
Simulation of large-scale dynamic systems
N75-29846
AIRCRAFT NOISE
Trends in aircraft noise control
N75-29008
Annoyance resulting from intrusion of aircraft sounds upon various activities
[NGR-43-008-008] N75-29112
A computer program for helicopter rotor noise using Lowson's formula in the time domain
[NASA-TM-X-72759] N75-29116
AIRCRAFT PARTS
The impact between a liquid drop and an elastic half-space
[PB-241155/1] N75-29378
AIRCRAFT SAFETY
An overview of the FAA engineering and development programs with highlights of fiscal years, 1975-1976 --- progress in aircraft safety, instrument landing systems, radar navigation, and air traffic control
[AD-A010266] N75-29063
Flight safety work of the German Aviation and Space Research Institute
[DLR-MITT-75-05] N75-29070
AIRCRAFT STABILITY
Theoretical prediction of airplane stability derivatives at subcritical speeds
[NASA-CR-132681] N75-29089
A direct time history study of the response of an airplane to nonstationary turbulence
[AD-A006159] N75-29102
A throat-bypass stability system for a YF-12 aircraft research inlet using self-acting mechanical valves
[NASA-TM-X-71779] N75-29128
AIRCRAFT STRUCTURES
Shear and moment response of the airplane wing to nonstationary turbulence
[NAL-TR-404T] N75-29032
Recent NASA progress in composites --- application to spacecraft and aircraft structures
[NASA-TM-X-72713] N75-29188
AIRCRAFT WAKES
On wake vortex alleviation
N75-29010
AIRFOIL PROFILES
Theoretical effect of modifications to the upper surface of two NACA airfoils using smooth polynomial additional thickness distributions which emphasize leading edge profile and which vary linearly at the trailing edge
[NASA-CR-137717] N75-29030
AIRFOILS
Effects of Reynolds number and roughness on C sub Lmax --- aerodynamic characteristics of airfoil
[NAL-TR-396] N75-29026
Transonic data memorandum: Second-order method for estimating the subcritical pressure distribution on a two-dimensional aerofoil in compressible inviscid flow
[ESDU-72025] N75-29029
Higher order wind tunnel corrections for a two-dimensional circular arc lifting aerofoil in a closed rectangular wind tunnel
[ARL/A-NOTE-349] N75-29034
Experimental and theoretical investigations on the problem of propeller/wing interference up to high angles of attack
[NASA-TT-F-16490] N75-29035
Wind tunnel generation of sinusoidal lateral and longitudinal gusts by circulation of twin parallel airfoils
[NASA-CR-137547] N75-29351
AIRFRAMES
Technical evaluation report on fluid dynamics panel symposium on Airframe/Propulsion --- a discussion of air intakes, nozzle flow, and flow distribution
[AGARD-AR-81] N75-29114
AIRLINE OPERATIONS
The next forty years in aviation
N75-29007
AIRPORT TOWERS
Study to develop regional and nation-wide estimates of General Aviation [GA] activity at non-towered airports
[AD-A009883] N75-29062
AIRPORTS
Airport vicinity air pollution study: The impact of modified aircraft taxi procedures on airport air quality
[AD-A009882] N75-29572
ALASKA
Use of LANDSAT imagery for wildlife habitat mapping in northeast and east central Alaska
[E75-10367] N75-29509
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525
ALBEDO
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 2: The spectral albedo
N75-29671
ALCOHOLS
Vapour pressures and critical points of pure substances. 4: C1 to C20 alcohols
[ESDU-74023] N75-29197
ALDEHYDES
Thermal conductivity of liquid n-alkyl aldehydes and ketones
[ESDU-71024] N75-29204
Normal melting points, boiling points and critical points of n-alkyl aldehydes and ketones
[ESDU-71023] N75-29206
ALFALFA
Recognition map analysis and crop acreage estimation
[E75-10375] N75-29517
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Recognition map analysis and crop acreage estimation
[E75-10380] N75-29522
ALGORITHMS
Intermittent positive control computer algorithm for test bed experiments --- collision avoidance - aircraft guidance
[AD-A009215] N75-29068
Evaluation of algorithms for linear array beamforming on the AN/UYK-17 [XB-1] [V] signal processing element
[AD-A006251] N75-29315
A hypothetical dialogue exhibiting a knowledge base for a program understanding system
[AD-A006294] N75-29799
An analysis of Lanczos algorithms for symmetric matrices
[AD-A006361] N75-29835
ALKANES
Thermal conductivity of liquid aliphatic hydrocarbons. 1: Alkanes
[ESDU-75003] N75-29193
Vapour pressures of pure substances up to their critical points. 1: C1 to C8 alkanes
[ESDU-72028] N75-29210
ALKENES
Vapour pressures of pure substances up to their critical points. 2: C2 to C6 alkenes [monoolefines]
[ESDU-73008] N75-29201
ALLOCATIONS
Allocation methodology. Distance determinations and population catchment determinations, and their applicability to practical planning --- urban planning - information systems
[NASA-TT-F-16495] N75-29856
ALLOYS
Center for high energy forming
[AD-A006259] N75-29446
Background information for standards of performance: Electric submerged arc furnaces for production of ferroalloys. Volume 1: Proposed standards
[EPA-450/2-74-018A] N75-29573
ALLUVIUM
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
ALUMINUM
Development document for effluent limitations guidelines and new source performance standards for the primary aluminum smelting subcategory of the aluminum segment of the nonferrous metals manufacturing point source category
[PB-240859/9] N75-29576
Processing composite materials with a metallic matrix --- aluminum between nickel coated carbon fibers
N75-29992
ALUMINUM ALLOYS
The effects of notches of high Kt on the fatigue behaviour of 7178-T6 aluminium alloy
[ARL/SM-354] N75-29244
Determination of structural engineering properties of incoloy 903 and CTX-1 alloys
[NASA-CR-120673] N75-29247
Development of sputtered techniques for thrust chambers
[NASA-CR-134824] N75-29248
Fractography of fatigue crack propagation in 2024-T3 and 7075-T6 aluminium alloys tested in air and vacuum
[NLR-TR-74094-U] N75-29253
Aluminum alloys: Industrial deformable, sintered and light aluminum alloys
[AD-A005984] N75-29255
Characterization of 2014-T651 aluminum alloy --- compression tests performed under various strain rates and stress states
[AD-A006260] N75-29259
The effect of mean stress on the fatigue of aluminum alloys --- notched specimens
[S/T-MEMO-9/74] N75-29482
Fatigue crack propagation in thin sheets of L73 under constant strain amplitude
[ARC-CP-1314] N75-29485
The thickness effect in plane stress fracture toughness
[NLR-TR-74032-U] N75-29487
ALUMINUM COATINGS
Hot corrosion evaluation of aluminide coated superalloys in support of an ASTM Round Robin program
[NASA-TM-X-71734] N75-29240
Thermodynamics and kinetics of reactions in protective coating systems
[NASA-CR-143313] N75-29249
ALUMINUM NITRIDES
Effect of oxygen impurity on the pressure-sintering of aluminum nitride
[NASA-TT-F-16452] N75-29237
ALUMINUM OXIDES
Development of high intensity ion sources --- aluminum oxides
[AD-A005824] N75-29906
AMBIENT TEMPERATURE
Thermodynamic analysis of direct low-temperature cycles
[BLL-RTS-9548] N75-29935
AMMETERS
Coupling considerations for squid devices
[AD-A006324] N75-29345
AMORPHOUS MATERIALS
Direct observation of small cluster mobility and ripening --- during annealing of metal films on amorphous substrates
[NASA-TM-X-62456] N75-29915
AMORPHOUS SEMICONDUCTORS
Amorphous semiconductors
[AD-A005831] N75-29931
AMPLITUDES
Comparative study of counting methods by digital simulation
[NAL-TR-408] N75-29789
ANALOG DATA
Interfacing a 24-point analog recorder to a computer controlled telemetry line --- for water pollution monitoring
[PB-241086/8] N75-29403
A new transient signal analysis unit --- aerodynamic percussion analysis using magnetic disk unit
N75-29994
ANALOG TO DIGITAL CONVERTERS
Apparatus and programs for digital analysis of fluctuating quantities in turbulent flow
[IC-AERO-74-09] N75-29793
ANGLE OF ATTACK
Longitudinal motions of aircraft involving high angles of attack
[ARC-R/M-3753] N75-29094
Measurements at the leeward side of a cone at large incidences in supersonic flow
[VTH-186] N75-29370

ANGULAR DISTRIBUTION
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 1: Reflection indicatrix
N75-29670
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 2: The spectral albedo
N75-29671

ANISOTROPIC MEDIA
The Rayleigh velocity for a slightly anisotropic, orthotropic solid
[AD-A006148] N75-29920

ANTARCTIC REGIONS
Comparative characteristics of the main types of climatic clothing of Vostok Station personnel --- in Antarctic region
[AD-A005876] N75-29788

ANTENNA ARRAYS
Adaptive angle tracking --- with phased array antennas
[AD-A006279] N75-29306

ANTENNA DESIGN
Electronically steerable millimeter wave antenna techniques for space shuttle applications
[NASA-CR-143813] N75-29291
Design, manufacture and test of an electrical model of a shaped beam antenna for a maritime satellite
[ESRO-CR[P]-644] N75-29303

ANTENNA RADIATION PATTERNS
An analysis of aircraft L-band beacon antenna patterns
[AD-A005569] N75-29287
Design, manufacture and test of an electrical model of a shaped beam antenna for a maritime satellite
[ESRO-CR[P]-644] N75-29303

ANTENNAS
Optical-band antennas
[AD-A005966] N75-29421

ANTHROPOMETRY
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 1: Technical report
[PB-240920/9] N75-29783
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 2: Accelerator sled test data
[PB-241121/3] N75-29784

ANTIDOTES
A structure activity study of oximes aiming at prophylaxis against organophosphates
[CL-1974-23] N75-29744

ANTIGRAVITY
The plus Gz protective methods for use in advanced fighter-attack aircraft
N75-29727

APOLLO PROJECT
Research, development and application of noncombustible Beta fiber structures --- for Apollo
[NASA-CR-144365] N75-29186
Image processing and data reduction of Apollo low light level photographs
[NASA-CR-144659] N75-29389

APOLLO SOYUZ TEST PROJECT
AST-6/CSM training console operations manual --- Apollo Soyuz test project
[NASA-CR-144370] N75-29137
Test plan/procedure for the checkout of the USA cable communications test configuration for the electromagnetic compatibility [EMC] tests
[NASA-CR-144369] N75-29293

APPROACH CONTROL
Advanced air traffic management system study: Technical summary
[PB-241223/7] N75-29086

APPROXIMATION
An approximate method of solving boundary value problems
[BLL-M-23691-[5828.4F]] N75-29817
Spline approximation to the solution of the linear Fredholm integral equation of the second kind
[AD-A006539] N75-29827
Rational approximations to the solution of Fredholm integral equations
[AD-A006458] N75-29834
Approximation of complex aerospace systems by simpler ones
[AD-A006466] N75-29859

APTITUDE
The measurement of operator capacity by manipulation of dual task demands
[AD-A006352] N75-29765

ARC DISCHARGES
Electrical characteristics of a free-burning direct-current argon arc operating between 90 and 563 kilowatts with two types of cathodes
[NASA-TN-D-8032] N75-29896

ARC JET ENGINES
Mechanisms of magnetoplasmadynamic arc jet acceleration processes
[AD-A006234] N75-29903

ARC WELDING
TAT welding technology training program
[PB-241047/0] N75-29447

ARCTIC REGIONS
The components of the energy balance of the atmosphere and underlying surface in the northern polar regions
[BLL-M-23619-[5828.4F]] N75-29601

AREA NAVIGATION
Preliminary two-dimensional area navigation terminal simulation
[AD-A006263] N75-29076

ARGON
Electrical characteristics of a free-burning direct-current argon arc operating between 90 and 563 kilowatts with two types of cathodes
[NASA-TN-D-8032] N75-29896

ARID LANDS
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs --- Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain
[E75-10382] N75-29524

ARIEL 1 SATELLITE
Analysis of the orbit of Ariel 1, 1962-15A, near 15th-order resonance
[RAE-TR-74107] N75-29148

ARIZONA
A regional land use survey based on remote sensing and other data --- Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona
[E75-10374] N75-29516

ARMED FORCES
A study on medical officer career management and retention in the USA armed forces
N75-29729

ARMED FORCES [UNITED STATES]
Evaluation of proposed criteria to be used in the selection of candidated for reliability improvement warranties --- cost analysis - government procurement/armed forces [United States]
[AD-A006335] N75-29460
An evaluation of the major qualifications desired of Air Force system program managers
[AD-A006360] N75-29940

AROMATIC COMPOUNDS
A method of preparing aromatic polyimides having uniquely low softening temperatures
[NASA-CASE-LAR-11828-1] N75-29181
Thermal conductivity of liquid aromatic compounds containing oxygen
[ESDU-74032] N75-29194
Thermal conductivity of liquid aromatic compounds containing nitrogen
[ESDU-74034] N75-29195
Thermal conductivity of liquid halogenated aromatic hydrocarbons
[ESDU-74014] N75-29198
Thermal conductivity of liquid aromatic hydrocarbons
[ESDU-74007] N75-29199
Biodegradation of some polynuclear aromatic petroleum components by marine bacteria
[AD-A006346] N75-29733

ARSENIDES
Amorphous semiconductors
[AD-A005831] N75-29931

ARTIFICIAL CLOUDS
Controlled generation of large volumes of atmospheric clouds in a ground-based environmental chamber
[NASA-TM-X-3266] N75-29638

ARTIFICIAL INTELLIGENCE
A hypothetical dialogue exhibiting a knowledge base for a program understanding system
[AD-A006294] N75-29799
Computer generation of natural language from a deep conceptual base
[AD-A005041] N75-29809
Machine-aided retrieval
[AD-A006500] N75-29947

ARTIFICIAL SATELLITES
Photoelectron emission analysis of surface elements of the International Sun Earth Explorer
[NASA-CR-143811] N75-29916

ASSESSMENTS
Protective clothing: Assessment of need, volume 1
[PB-241167/6] N75-29785

ASTEROIDS
UBV photometry of asteroid 433 Eros
[NASA-CR-143316] N75-29963

ASTRONAUT LOCOMOTION
Preliminary research on body displacement during lunar walking
N75-29726

ASTRONAUT MANEUVERING EQUIPMENT
Premission and postmission simulation studies of the foot-controlled maneuvering unit for Skylab experiment T-020 --- astronaut maneuvering equipment - space environment simulation
[NASA-TN-D-7963] N75-29153

ASTRONAUT PERFORMANCE
Voices in orbit --- speech analysis for monitoring astronaut performance
[NASA-TT-F-16499] N75-29758

ASTRONOMICAL OBSERVATORIES
Orbital requirements for the Astronomical Roentgen Observatory Satellite
[RAE-TR-74110] N75-29149
Interpretation of surface features of Europa obtained from occultations by Io --- astronomical observations - Jupiter [planet]
[NASA-CR-143273] N75-29938
Activities of the Institute of Astronomy
N75-29966

ASTRONOMY
Activities of the Institute of Astronomy
N75-29966

ASTROPHYSICS
Plasma on earth and in space
[NASA-TT-F-16373] N75-29895
Pulsar extinction --- astrophysics
[NASA-CR-143272] N75-29969
A course in practical astrophysics --- textbooks - universities, U.S.S.R.
[NASA-TT-F-15570] N75-29970

ASYMPTOTIC METHODS
The asymptotic behaviour of the Hurst range
[RR-164/PSC/3] N75-29841

ATLANTIC OCEAN
Oil-pollution detection and monitoring from space using ERTS-1
[E75-10381] N75-29523
Atmospheric disturbances over the Atlantic GATE area as seen from satellite data --- cyclones
N75-29642
On characteristic time scales of meteorological fields in the tropical Atlantic zone
N75-29645
On modulation interaction of the various scale waves in the Atlantic tropical zone
N75-29646
Observations on convective clouds over the tropical Atlantic
N75-29653
Aerosol and water vapour influences on direct solar radiation fluxes in the centre of equatorial Atlantic
N75-29672
On the relation between optical and aerosol characteristics of the east Atlantic atmosphere
N75-29673
Fluctuations in the vertical structure of the Atlantic equatorial undercurrent
N75-29675
On the reality of existence of sporadic large-scale eddy formations in the ocean
N75-29676
Main statistical characteristics of currents in the northern part of B-scale
N75-29678
Visibility on the Atlantic Ocean and the North Sea
[PHL-1974-32] N75-29688
A statistical verification of a ten year time series of computed surface wind conditions over the North Pacific and North Atlantic Oceans
[AD-A005869] N75-29704
Systematic variations in inshore bathymetry
[AD-A006393] N75-29709

ATMOSPHERIC ATTENUATION
Rain attenuation studies
[AD-A006123] N75-29310
Atmospheric transmission computer program CP
[NASA-TM-X-58137] N75-29602
Radiation scattering by atmospheric aerosols
[AD-A006081] N75-29889

ATMOSPHERIC BOUNDARY LAYER
Preliminary results of acoustic echo sounding of the marine boundary layer during GATE
N75-29665
Turbulent characteristic measurements in the marine boundary layer during GATE
N75-29667
Marine physics: Internal-surface wave interaction and microstructure measurement program
[AD-A005828] N75-29707

ATMOSPHERIC CIRCULATION
On the structure and organization of clouds in the GATE area
N75-29655

ATMOSPHERIC COMPOSITION
WMO operations manual for sampling and analysis techniques for chemical constituents in air and precipitation. Part 1: The minimum programme at regional air-pollution stations. Part 2: Guidelines for baseline stations and regional stations with extended programmes
[WMO-299] N75-29574
A spectroscopic study of California smog
[PB-241022/3] N75-29594
Meteorological data. Volume 138, no. 2: Daily altitude charts of the 30 millibar level and mean monthly charts for 1973. Parts 3 and 4, 3rd and 4th. Quarters stratosphere working group
N75-29629
Calculations of the mean regional dispersion of a radioactive gas emitted from a continuous source
[AC-29] N75-29685

ATMOSPHERIC DIFFUSION
Determination of the feasibility of the long-range transport of ozone or ozone precursors
[PB-241159/3] N75-29617
ATMOSPHERIC ENTRY
The relative effects of entry parameters on thermal protection system weight --- space shuttle orbiters
[NASA-CR-144386] N75-29166
ATMOSPHERIC HEAT BUDGET
The components of the energy balance of the atmosphere and underlying surface in the northern polar regions
[BLL-M-23619-[5828.4F]] N75-29601
The role of the tropical zone in processes occuring in the system ocean - atmosphere - continent --- heat flow from the tropics to the Eurasian continent
[BLL-M-23692-[5828.4F]] N75-29634
ATMOSPHERIC MODELS
How to build Gulliver's watch [biosphere model]
[NASA-TT-F-16455] N75-29606
Atmospheric response function for the calculation of riometer absorption
[AD-A006112] N75-29625
World climate and world food systems 5: The special model; history and present state of the art
[PB-240874/8] N75-29693
ATMOSPHERIC MOISTURE
A feasibility study of a microwave water vapor measurement from a space probe along an occultation path
[NASA-CR-143266] N75-29603
ATMOSPHERIC OPTICS
Mass-production model of automatic RDV-1 photometer for measuring and recording atmospheric transparency
[AD-A006076] N75-29394
Investigation of relationships between linears, tonal and hazy anomalies, and petroleum production in the Williston Basin: An ERTS approach
[E75-10370] N75-29512
On the relation between optical and aerosol characteristics of the east Atlantic atmosphere
N75-29673
ATMOSPHERIC RADIATION
Atmospheric measurements at millimeter wavelengths
[AD-A006128] N75-29626
ATMOSPHERIC SCATTERING
Multiple scattered radiation emerging from continental haze layers. 1: Radiance, polarization, and neutral points
[NASA-CR-143269] N75-29605
Multiple scattered radiation emerging from continental haze layers. 2: Ellipticity and direction of polarization
[NASA-CR-143284] N75-29985
ATMOSPHERIC TEMPERATURE
Preliminary analysis of a selective sample of GATE ship and aircraft data --- upper atmosphere temperature and humidity
N75-29659
Vertical structure of hemispheric temperature spectral components
[DM-13] N75-29686
ATMOSPHERIC TURBULENCE
Shear and moment response of the airplane wing to nonstationary turbulence
[NAL-TR-404T] N75-29032
Short-term spot size and beam wander in a turbulent medium
[AD-A006032] N75-29413
Irradiance scintillations: Comparison of theory with experiment
[AD-A006365] N75-29888
ATOMIC ENERGY LEVELS
Energy measurements
N75-29879
ATOMIC EXCITATIONS
Energy measurements
N75-29879
ATOMIC MOBILITIES
Direct observation of small cluster mobility and ripening --- during annealing of metal films on amorphous substrates
[NASA-TM-X-62456] N75-29915
ATS 6
AST-6/CSM training console operations manual --- Apollo Soyuz test project
[NASA-CR-144370] N75-29137
ATS-6 millimeter wavelength propagation experiment
[NASA-CR-143832] N75-29290
ATS-6 millimeter wavelength propagation experiment --- a data acquisition system
[NASA-CR-143829] N75-29944
ATTACK AIRCRAFT
Extension of the method for predicting six-degree-of-freedom store separation trajectories at speeds up to the critical speed to include a fuselage with noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment --- external stores - attack aircraft
[AD-A005822] N75-29071
ATTENTION
A review of recent models of attention --- for jet pilot training
[AD-A006155] N75-29769
ATTENUATION COEFFICIENTS
The feasibility of ranking material fracture toughness by ultrasonic attenuation measurements
[NASA-TM-X-71769] N75-29241
AURORAL ZONES
Electron angular distributions above the dayside auroral oval
[NASA-CR-143267] N75-29604
A mechanism for driving the gross Birkeland current configuration in the auroral oval --- energy dissipation - plasma sheaths/geomagnetic tail
[TRITA-EPP-74-25] N75-29607
AUSFORMING
Comparison of pitting fatigue life of ausforged and standard forged AISI M-50 and AISI 9310 spur gears
[NASA-TN-D-8030] N75-29435
AUSTENITIC STAINLESS STEELS
Comparison of pitting fatigue life of ausforged and standard forged AISI M-50 and AISI 9310 spur gears
[NASA-TN-D-8030] N75-29435
AUTOCORRELATION
Applications of the PARCOR coefficients for linear prediction of stationary processes --- partial autocorrelation coefficient for digital voice processing
[TB-173] N75-29302
AUTOMATIC CONTROL
Miniaturized high speed controls for turbine engines fabrication and test
[AD-A006108] N75-29125
Study of the quality of autonomous and separate control of monohydrate concentration and level in sulfuric acid plants
[NASA-TT-F-16491] N75-29214
AUTOMATIC FLIGHT CONTROL
Airborne electronics for automated flight systems
N75-29011
Status and trends in active control technology
N75-29015
AUTOMATIC PILOTS
Digital simulation of V/STOL aircraft for autopilot research
N75-29853
AUTOMATIC TEST EQUIPMENT
An automatic charge-discharge device for testing storage batteries
[AD-A005978] N75-29568
AUTOMOBILES
Analysis of problems in the application of radar sensors to automotive collision prevention
[PB-240950/6] N75-29317
State standards of the USSR, lead-acid automotive storage batteries GOST 959.0-71
[AD-A006093] N75-29563
Effect of the electrolyte temperature during charging of plates on the characteristics of electrodes and cells of lead acid automotive storage batteries
[AD-A006079] N75-29565
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 1: Technical report
[PB-240920/9] N75-29783
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 2: Accelerator sled test data
[PB-241121/3] N75-29784
AXES OF ROTATION
Limitation on the use of the horizontal clinostat as a gravity compensator
[NASA-CR-143288] N75-29386
AXIAL FLOW
Three-dimensional inviscid effects in axial flow turbomachinery and limitation of cascade theory
[NAL-TR-379T] N75-29355
AXIAL STRESS
Deformation and failure under multiaxial stresses: A survey of laboratory techniques and experimental data
[ARC-CP-1306] N75-29484
AXISYMMETRIC BODIES
Nonlinear spatial wave development in an axisymmetrical turbulent jet
[NRC-14756] N75-29364
Radiation transport in axisymmetric geometries
[AD-A006252] N75-29422
AXISYMMETRIC FLOW
A numerical determination of the bow shock wave in transonic axisymmetric flow about blunt bodies
[NASA-TM-X-72448] N75-29033
Some unseparated base flows with heat addition
[ARC-R/M-3756] N75-29041
Analysis of an axisymmetrical turbulent pulsating jet
[VKI-TN-104] N75-29045

B

BACTERIA
Biodegradation of some polynuclear aromatic petroleum components by marine bacteria
[AD-A006346] N75-29733
BALL BEARINGS
Operating limitations of high speed jet lubricated ball bearings
[NASA-TM-X-71678] N75-29429
Ball bearings for inertial type gyroscopes: Low speed operation study
[LRBA-E-602-NT-26/SIE] N75-29437
BALLOON SOUNDING
Balloon sounding of the atmosphere
[NASA-TT-F-16380] N75-29635
The quality of upper air observations in the GATE B-area --- using Omega and VLF navigation systems and balloon sounding
N75-29652
BAND STRUCTURE OF SOLIDS
D-band surface states on wide band gap insulators. A conceptual model for surface states and catalysis on D-band perovskites
[AD-A005783] N75-29933
BARIUM COMPOUNDS
Magnetic and electrical properties of novel compounds in the alkaline earth-transition metal-sulfur and selenium systems
[AD-A005723] N75-29918
BASE FLOW
Some unseparated base flows with heat addition
[ARC-R/M-3756] N75-29041
BASIC [PROGRAMMING LANGUAGE]
Computer-aided amplifier design in BASIC
[AD-A006370] N75-29331
BATCH PROCESSING
ACS batch processing system. Volume 1: System design document
[AD-A005304] N75-29537
ACS batch processing system. Volume 2: User's guide
[AD-A005305] N75-29538
ACS batch processing system. Volume 3: System and functional program description
[AD-A005306] N75-29539
A production environment evaluation of interactive programming
[AD-A006502] N75-29795
BATHYMETERS
Systematic variations in inshore bathymetry
[AD-A006393] N75-29709
A program to plot bathymetric and magnetic anomaly profiles
[AD-A006253] N75-29716
BATHYTHERMOGRAPHS
Project Stormwater: The collection of bathythermographic data and airborne radiation sea surface temperature measurements in the wake of hurricane Irah
[AD-A005909] N75-29717
BAYES THEOREM
Control techniques for production processes using Bayesian estimation and exponential smoothing
[PB-241142/9] N75-29810
Optimal linear and nonlinear feature extraction based on the minimization of the increased risk of misclassification --- Bayes theorem - statistical analysis/data processing
[NASA-CR-144385] N75-29821
On the empirical Bayes approach to multiple decision problems
[AD-A006543] N75-29828
BEACONS
Discrete address beacon system/air traffic control interface configuration document. Volume 2: Enroute hardware for phase 1
[AD-A009307] N75-29081
BEAMS [RADIATION]
High-energy beams and magnetic spectrometers
[ISS-L-74/8] N75-29861
BEAMS [SUPPORTS]
Behavior of four steel lightweight concrete composite beams under long lasting loads
[CRIF-MT-93] N75-29479
BEARINGS
A theoretical and experimental investigation of the magnetic fields and forces arising in magnetic suspension systems
[AD-A006109] N75-29443
The application of the phenomenon of selective transfer to increase the durability of parts in fuel units
[AD-A005975] N75-29445
BEDS [PROCESS ENGINEERING]
Inter-particle percolation. Part 1: Demonstration of the phenomenon and equipment development --- granular materials, shear strain
[OUEL-1102/74-PT-1] N75-29864
Inter-particle percolation. Part 2: Results and discussion --- granular materials, shear strain
[OUEL-1103/74-PT-2] N75-29865
BENDING VIBRATION
Vibrations in centrifugal pump units by external systems
[BLL-CE-TRANS-6643-[9022.09]] N75-29427

BENZENE
Thermodynamic properties of benzene
[ESDU-73009] N75-29200
Vapour pressures of pure substances up to their critical points. 3: C6 to C10 alkylbenzenes
[ESDU-73029] N75-29202
BERNSTEIN ENERGY PRINCIPLE
The use of Bernstein polynomials in approximating a function and its derivative
[BLL-M-23707-[5828.4F]] N75-29428
BERYLLIUM ISOTOPES
Stripping to unbound states --- on targets of beryllium, carbon, and oxygen isotopes
N75-29877
BIBLIOGRAPHIES
Aeronautical satellite [AEROSAT] program related bibliography
[AD-A005987] N75-29154
The Shock and Vibration Digest, Volume 7, No. 2, February 1975 --- finite element method
[AD-A006665/4] N75-29465
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 142
[NASA-SP-7011[142]] N75-29735

BINARY ALLOYS
Directionally solidified pseudo-binary eutectics of Ni-Cr-[Hf, Zr]
[NASA-TM-X-71765] N75-29243
Aluminum alloys: Industrial deformable, sintered and light aluminum alloys
[AD-A005984] N75-29255
BINARY STARS
Why are there so few X-ray stars?
[NASA-TT-F-16296] N75-29971
BIOINSTRUMENTATION
Limitation on the use of the horizontal clinostat as a gravity compensator
[NASA-CR-143288] N75-29386
BIOLOGICAL EFFECTS
The effect of sonic boom on the nesting and brood rearing behavior of the eastern wild turkey
[AD-A005986] N75-29730
Resistance of Nadsoniella nigra var. hesuelica to the action of a high vacuum
[NASA-TT-F-16503] N75-29732
Research on biological effects of VLF band electromagnetic radiation
[AD-A006388] N75-29753
BIOLOGY
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 142
[NASA-SP-7011[142]] N75-29735
BIOMEDICAL DATA
A summary of Skylab findings of interest to life scientists
N75-29725
Evaluation of an acoustical X-Y digitizer for use in biomedical data reduction tasks
[AD-A005293] N75-29746
Stepwise Iterative Fourier Transform: The SIFT
[NASA-CR-144377] N75-29820
BIRDS
A review of clutter, 1974
[RRE-TN-783] N75-29300
Utilization of Skylab [EREP] system for appraising changes in continental migratory bird habitat
[E75-10361] N75-29503
BISTABLE CIRCUITS
Analysis of flow in a bistable fluidic element to improve its characteristics --- with downstream flow measured by optical anemometer
[AD-A006087] N75-29371
BLOOD PRESSURE
Effects of 60 Co on electrical self-stimulation of the brain and blood pressure
[AD-A006428] N75-29751
BLUNT BODIES
A numerical determination of the bow shock wave in transonic axisymmetric flow about blunt bodies
[NASA-TM-X-72448] N75-29033
Numerical computation of three-dimensional blunt body flow fields with an impinging shock
[NASA-CR-143312] N75-29038
BODY-WING AND TAIL CONFIGURATIONS
Measurement and analysis of unsteady aerodynamic force for the vertical gust on an airplane model in the NAL gust wind tunnel --- swept wing interference tests
[NAL-TR-399] N75-29027
BOEING 727 AIRCRAFT
Wind tunnel test of model target thrust reversers for the Pratt and Whitney aircraft JT8D-100 series engines installed on a 727-200 airplane
[NASA-CR-134709] N75-29117
BOILERS
Development document for effluent limitations guidelines and new source performance standards for the steam electric power generating point source category
[PB-240853/2] N75-29575
BOMBS [ORDNANCE]
A computer simulation of release parameter effects upon bomb impact distributions
[AD-A006347] N75-29844
BOOSTER ROCKET ENGINES
Reentry static stability characteristics of a [Model 471] .005479-scale 146-inch solid rocket booster tested in the NASA/MSFC 14 by 14 inch TWT [SA8F]
[NASA-CR-141549] N75-29163
BORIDES
Electrical and thermoemission properties of alloys lanthanum and cerium hexaborides with transition metals
[AD-A005980] N75-29921
BORON
The characteristics of self sustained particulate boron combustion in air at ambient pressure
[AD-A006039] N75-29233
BORON REINFORCED MATERIALS
Fiber reinforced solids possessing great fracture toughness: The role of interfacial strength
[NASA-CR-143287] N75-29474
BOUNDARY LAYER CONTROL
Opportunities for aerodynamic-drag reduction
N75-29016
BOUNDARY LAYER EQUATIONS
A numerical method for the solution of the two-dimensional steady laminar boundary layer equations
[VKI-TN-103] N75-29044
BOUNDARY LAYER FLOW
A numerical method for the solution of the two-dimensional steady laminar boundary layer equations
[VKI-TN-103] N75-29044
BOUNDARY LAYER SEPARATION
A hot-wire surface gage for skin friction and separation detection measurements
[NASA-TM-X-62465] N75-29384
BOUNDARY LAYERS
Response analysis of a clamped plate to boundary layer pressure fluctuations
[NAL-TR-401] N75-29475
BOUNDARY VALUE PROBLEMS
An approximate method of solving boundary value problems
[BLL-M-23691-[5828.4F]] N75-29817
An H sup [-1] Galerkin method for parabolic problems in a single space variable
[AD-A006541] N75-29826
Complete families of solutions for parabolic equations with analytic coefficients
[AD-A005820] N75-29829
The approximation of solutions to initial-boundary value problems for parabolic equations in one space variable
[AD-A006233] N75-29831
BOW WAVES
A numerical determination of the bow shock wave in transonic axisymmetric flow about blunt bodies
[NASA-TM-X-72448] N75-29033
BRAIN
Effects of 60 Co on electrical self-stimulation of the brain and blood pressure
[AD-A006428] N75-29751
BRAKES [FOR ARRESTING MOTION]
Analysis of problems in the application of radar sensors to automotive collision prevention
[PB-240950/6] N75-29317
BREADBOARD MODELS
Breadboard linear array scan imager program
[NASA-CR-143828] N75-29887
BREATHING APPARATUS
Improved mine rescue breathing apparatus
[PB-241105/6] N75-29787
BREMSSTRAHLUNG
Calculations of X-ray Breusstrahlung spectra and scintillator detector yields for relativistic electron energies from 10 keV to 10 MeV
[AD-A006552] N75-29902
BRIGHTNESS TEMPERATURE
Ground truth data for test sites [SL-3] --- solar radiation and thermal radiation brightness temperature measurements
[NASA-CR-141911] N75-29531
Ground truth data for test sites [SL-4] --- thermal radiation brightness temperature and solar radiation measurments
[NASA-CR-141912] N75-29532
BROADBAND
Broadband ferrite limiters --- microwave equipment
[AD-A005279] N75-29328
BROADCASTING
The estimation of the service areas of medium and long-wave broadcasting stations
[BBC-RD-1975/1] N75-29281
BRUSH [BOTANY]
Recognition map analysis and crop acreage estimation
[E75-10375] N75-29517
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525
BUCKLING
Flat panels in shear. Buckling of long panels with transverse stiffeners
[ESDU-02.03.02] N75-29469
BUILDINGS
Natural hazards evaluation of existing buildings
[COM-75-10473/7] N75-29492
BUOYS
Federal plan for environmental data buoys
[COM-75-10511/4] N75-29699
BURNERS
Hot corrosion in burner gas at 1200 C
[NASA-TT-F-16509] N75-29245
BURNING RATE
Transition from deflagration to detonation in condensed phases
[TT-74-50028] N75-29213

C

CABLES
On the question of static computation of saddle-shapped suspended coverings according to a discrete diagram
[AD-A005997] N75-29498
CABLES [ROPES]
Ship to shore Oregon test series 2
[AD-A006043] N75-29058
Balloon armament test [test plan]
[AD-A006045] N75-29059
User's guide for a revised computer program to analyze the LRC 16 foot transonic dynamics tunnel active cable mount system --- computer techniques - aircraft models
[NASA-CR-132692] N75-29130
Procedure for testing synthetic fiber cables for flexing fatigue under load
[AD-A006042] N75-29189
Cable strumming experiments
[AD-A005894] N75-29715
CADMIUM SULFIDES
Long wave sensitivity of solar converters N-CdS-Cu[2-x]S
[AD-A005918] N75-29566
CALCIUM OXIDES
Load deflection behavior of lime stabilized layers
[AD-A006015] N75-29494
CALCULUS OF VARIATIONS
A hybrid approach to optimal control problems with bounded state. Part 1: Theory
[AD-A006191] N75-29815
CALIFORNIA
Statistical summary of the 1983 Los Angeles en-route center standard traffic model
[AD-A009011] N75-29073
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs --- Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain
[E75-10382] N75-29524
A spectroscopic study of California smog
[PB-241022/3] N75-29594
CAMERA TUBES
Electronic magnification for astronomical camera tubes
[NASA-CR-143827] N75-29961
CANADA
Data terminal technology, present and future. Volume 1: State-of-the-art
[CRC-1276-1-VOL-1] N75-29296
Investigation of relationships between linears, tonal and hazy anomalies, and petroleum production in the Williston Basin: An ERTS approach
[E75-10370] N75-29512
The use of LANDSAT DCS and imagery in reservoir management and operation --- Saint John River, Maine and Canada
[E75-10378] N75-29520
CARBON COMPOUNDS
Electrochemical measurement of carbon potential. Part 4: Studies on some sodium-steel systems at 910K
[RD/B/N-3157] N75-29217
CARBON DIOXIDE
Evaluation of pollution control in fossil fuel conversion processes: Gasification. Section 1: CO2 acceptor process
[PB-241141/1] N75-29596
Experimental studies of the collisional excitation of infrared active vibrational stretch modes in CO2 and H2O with an intersecting, hyperthermal molecular beam apparatus, volume I
[AD-A006237] N75-29886
CARBON DIOXIDE LASERS
Preliminary analysis of a light-gas gun-driven gas dynamic laser
[DREV-4011/75] N75-29406
A numerical study on the effects of viscosity on the performance of CO2 gasdynamic laser --- using laminar boundary layer model and turbulent wake model
[ISAS-528-VOL-40-NO-8] N75-29408
CO2 laser ranging systems study
[NASA-CR-144655] N75-29410
Gigawatt CO2 laser for laser-target interaction studies
[DREV-R-4017/75] N75-29411

Passive mode-locking of a large volume TEA-CO2 laser using an unstable resonator configuration
[DREV-R-4016/75] N75-29412
Investigate material systems for a mirrors used in high power CO and CO2 lasers
[AD-A006101] N75-29414
Parametric investigation of the Na-N2O + CO chemical laser
[AD-A006117] N75-29415
Investigation of high power MHD gas lasers
[AD-A006298] N75-29420
Investigations on the behavior of excited methyl-fluoride molecules in proximity of atoms
[REPT-8/1974] N75-29872

CARBON FIBERS
Processing composite materials with a metallic matrix --- aluminum between nickel coated carbon fibers
N75-29992

CARBON ISOTOPES
Stripping to unbound states --- on targets of beryllium, carbon, and oxygen isotopes
N75-29877

CARBON MONOXIDE
Carbon monoxide monitor --- using real time operation
[NASA-CASE-MFS-22060-1] N75-29380

CARBON MONOXIDE LASERS
Investigate material systems for a mirrors used in high power CO and CO2 lasers
[AD-A006101] N75-29414
Parametric investigation of the Na-N2O + CO chemical laser
[AD-A006117] N75-29415

CARBOXYLIC ACIDS
Normal melting points, boiling points and critical points of n-alkyl esters of monobasic n-alkanoic acids
[ESDU-71001] N75-29203
Thermal conductivity of liquid n-alkyl esters of monobasic n-alkanoic acids
[ESDU-71002] N75-29207
Thermal conductivity of liquid monobasic alkanoic acids
[ESDU-72007] N75-29208
Normal melting points, boiling points and critical points of monobasic alkanoic acids
[ESDU-72006] N75-29209

CARDIOTACHOMETERS
Measured effects of square wave modulated RF fields [450 and 3100 MHz] on cardiac pacemakers
[AD-A006389] N75-29755

CARDIOVASCULAR SYSTEM
The aircrewman at increased risk of ischemic vascular disease
N75-29728

CARGO SHIPS
Fuel conservation in ship operations
[COM-75-10466/1] N75-29270
Status and prospects for the development of air conditioning for naval vessels
[NASA-TT-F-16457] N75-29777

CASCADE FLOW
Three-dimensional inviscid effects in axial flow turbomachinery and limitation of cascade theory
[NAL-TR-379T] N75-29355

CATALOGS [PUBLICATIONS]
Summary of synoptic meteorological observations for Great Lakes areas. Volume 2: Lake Huron and Georgian Bay
[COM-75-10364/8] N75-29694
Summary of synoptic meteorological observations for Great Lakes areas. Volume 3: Lake Michigan
[COM-75-10365/5] N75-29695
Summary of synoptic meteorological observations for Great Lakes areas. Volume 4: Lake Superior
[COM-75-10366/3] N75-29696
Tables of non-vertical cutoff rigidities for 76 various locations --- geomagnetism, North America - Central America
[AD-A006397] N75-29973

CATALYSIS
D-band surface states on wide band gap insulators. A conceptual model for surface states and catalysis on D-band perovskites
[AD-A005783] N75-29933

CATALYTIC ACTIVITY
Synthesis of N-acetylneuraminic acid derivatives and studies of their interaction with vibrio cholerae neuraminidase
[FOA-B-40018-B6] N75-29182

CATHODES
Electrical characteristics of a free-burning direct-current argon arc operating between 90 and 563 kilowatts with two types of cathodes
[NASA-TN-D-8032] N75-29896

CAVITATION FLOW
Non-linear effects of surface tension in cavity flow
[AD-A006036] N75-29375

CAVITIES
The behavior of an axially loaded drilled shaft under sustained loading
[PB-240328/5] N75-29495

CDC 1604 COMPUTER
A ray trace program for the CDC 1604 computer
[AD-A005321] N75-29869

CELESTIAL REFERENCE SYSTEMS
Silicon star sensor --- for satellite attitude control
[AD-A006482] N75-29402

CELL CATHODES
Studies on pasted silver oxide electrodes suitable for a pile battery
[AD-A006447] N75-29557

CEMENTS
Characteristics of and factors influencing bituminous materials and mixture
[PB-240957/1] N75-29191

CENTRAL AMERICA
Tables of non-vertical cutoff rigidities for 76 various locations --- geomagnetism, North America - Central America
[AD-A006397] N75-29973

CENTRAL PROCESSING UNITS
Use of a microprocesor in a supervisory control application
[AD-A006119] N75-29791

CENTRIFUGAL PUMPS
Vibrations in centrifugal pump units by external systems
[BLL-CE-TRANS-6643-[9022.09]]
N75-29427

CERAMICS
Process for the preparation of sintered ceramics on a silicon nitride basis
[NASA-TT-F-16439] N75-29262

CERIUM COMPOUNDS
Electrical and thermoemission properties of alloys lanthanum and cerium hexaborides with transition metals
[AD-A005980] N75-29921

CERMETS
Effect of magnesium oxide content on oxidation behavior of some superalloy-base cermets
[NASA-TM-X-3265] N75-29187

CHALCOGENIDES
Modulation spectroscopy of layer semiconductors GaSe and GaTe
[ISS-L-74/2] N75-29911

CHANNEL FLOW
Numerical calculation of two classes of potential problems, illustrated with the flow from a channel against a wedge
[WTHD-71] N75-29366

CHARGE COUPLED DEVICES
Study of infrared solid state images using charge transport devices
[AD-A005736] N75-29925

CHARGE EXCHANGE
Charge-exchange plasma generated by an ion thruster
[NASA-CR-134844] N75-29175

CHARGE TRANSFER
An experimental study of reaction profiles in porous electrodes.
[AD-A005773] N75-29341

CHECKOUT
Shuttle checkout software system application verification laboratory manual
[NASA-CR-144378] N75-29169
Implementation of a mini-computer based information system. Part 18. A general file dump program for the Varian 620 computer --- for debugging and detection of machine failures
[AD-A008519] N75-29945

CHEMICAL ANALYSIS
WMO operations manual for sampling and analysis techniques for chemical constituents in air and precipitation. Part 1: The minimum programme at regional air-pollution stations. Part 2: Guidelines for baseline stations and regional stations with extended programmes
[WMO-299] N75-29574
Chemical, mineralogical and textural systematics of non-mare melt rocks: Implications for lunar impact and volcanic processes
[NASA-CR-143285] N75-29974

CHEMICAL COMPOSITION
Study of the quality of autonomous and separate control of monohydrate concentration and level in sulfuric acid plants
[NASA-TT-F-16491] N75-29214

CHEMICAL EFFECTS
Principles for evaluating chemicals in the environment
[PB-240916/7] N75-29595

CHEMICAL INDICATORS
Chemical controls for sterilization in autoclaves --- heat resistance indication for microorganisms
[NASA-TT-F-16478] N75-29718
Chemical controls for dry heat sterilization
[NASA-TT-F-16321] N75-29719

CHEMICAL LASERS
Fine orifice injector development
[AD-A006204] N75-29418

CHEMICAL PROPERTIES
The chemical deposition of dispersion coatings with Ni-P and Ni-B matrices. Embedding of oxides: Titanium dioxide
[BLL-LTI-746-01460-[9022.401]]
N75-29235

CHEMICAL REACTIONS
High energy halogen chemistry
[AD-A006468] N75-29227
Rate constants of some elementary stages of the reaction of fluorine with hydrogen
[AD-A006011] N75-29231

CHLORINE
Removal of manganese from mine drainage by ozone and chlorine
[PB-241143/7] N75-29541

CHOLINESTERASE
A structure activity study of oximes aiming at prophylaxis against organophosphates
[CL-1974-23] N75-29744

CHROMIUM ALLOYS
Method of heat treating age-hardenable alloys
[NASA-CASE-XNP-01311] N75-29236
Directionally solidified pseudo-binary eutectics of Ni-Cr-[Hf, Zr]
[NASA-TM-X-71765] N75-29243

CHROMOSPHERE
Photometric research for the K2, 3 chromospheric flocculi
N75-29982

CIRCUIT DIAGRAMS
Trielectrode capacitive pressure transducer
[NASA-CASE-ARC-10711-2] N75-29320

CIRCUIT PROTECTION
FAA lightning protection study: Lightning protection requirements for the ARTS 3 system --- circuit protection - radar
[AD-A009662] N75-29131

CIRCULAR CONES
Conical stagnation points in the supersonic flow around slender circular cones at incidence
[VTH-184] N75-29368

CITIES
Study of the utilization of EREP data from the Wabash River Basin --- Lake Monroe and Ft. Wayne, Indiana
[E75-10377] N75-29519

CIVIL AVIATION
Civil aviation midair collisions analysis: 1972 added to 1964 - 1971 results --- statistical analysis
[AD-A005897] N75-29064

CLASSICAL MECHANICS
Study of outer space by reaction devices --- classical mechanics - interplanetary flight - escape rockets/jet propulsion
[NASA-TT-F-15571] N75-29141

CLASSIFICATIONS
The decision tree approach to classification
[NASA-CR-141930] N75-29528

CLEANLINESS
Surface cleaning in thin film technology
[SAND-74-0344] N75-29183

CLIMATOLOGY
Meteorological data. Volume 141, no. 9: Results of synoptic services in 1974. Daily and monthly weather maps [surface, 850 millibars, 500 millibars], tables and brief scientific articles, September
N75-29628
World climate and world food systems 3: The lessons of climatic history
[PB-240872/2] N75-29691
World climate and world food systems 4: A survey of the state of the art in meteorological long range statistical forecasting
[PB-240873/0] N75-29692
World climate and world food systems 5: The special model; history and present state of the art
[PB-240874/8] N75-29693

CLOSED CYCLES
A cosmic model of the biosphere
[NASA-TT-F-16460] N75-29968

CLOUD COVER
Detection of crop mark contrast for archaeological surveys --- Great Britain
[E75-10364] N75-29506
Cloud cover dynamics over the tropical Atlantic during the GATE first observing period
N75-29648
Cloud cluster formation over monsoon Africa
N75-29649

CLOUD PHOTOGRAPHS
Meteorological data. Volume 145, no. 2: The European climatology for 1974. Meteorological satellite data from the Berlin zone of reception part 2, 2nd quarter
N75-29630

CLOUD PHOTOGRAPHY
On the structure of the cumulus clouds at the equator in connection with meteorological conditions according to the stereophotographic measurements on board the R/V Akademik Kurchatov
N75-29656

CLOUD PHYSICS
Controlled generation of large volumes of atmospheric clouds in a ground-based environmental chamber
[NASA-TM-X-3266] N75-29638
Observations on convective clouds over the tropical Atlantic
N75-29653

Case study of the physical structure of individual cumulo nimbus [mission 226-4, type 8B2] N75-29663
An investigation of interactions between double clouds using a two dimensional numerical model [AD-A006255] N75-29703
CLOUD SEEDING
An investigation of interactions between double clouds using a two dimensional numerical model [AD-A006255] N75-29703
CLOUDS [METEOROLOGY]
Use of LANDSAT imagery for wildlife habitat mapping in northeast and east central Alaska [E75-10367] N75-29509
Determination of certain parameters of clouds with the aid of a laser locator [BLL-M-23632-[5828.4F]] N75-29627
Preliminary scientific results of the GARP Atlantic tropical experiment, volume 2 [GATE-14-VOL-2] N75-29639
The low-level structure of an African disturbance determined by aircraft reconnaissance --- compared with satellite IR photography N75-29640
Investigation of the structure of precipitation areas --- using radar echoes N75-29657
Radar investigations of evolution of clouds in the eastern Atlantic N75-29658
CLUTTER
A review of clutter, 1974 [RRE-TN-783] N75-29300
Comparison of some classes of MTI filters for a 3-pulse canceller with staggered PRF [PHL-1974-38] N75-29323
COAL
Numerical simulation of flame induced aerodynamics in a coal-mine passageway, semi-empirical model [PB-240843/3] N75-29379
COAL GASIFICATION
Evaluation of pollution control in fossil fuel conversion processes: Gasification. Section 1: CO2 acceptor process [PB-241141/1] N75-29596
COASTAL PLAINS
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs --- Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain [E75-10382] N75-29524
COASTAL WATER
A bibliography of numerical models for tidal rivers, estuaries and coastal waters [COM-75-10477/8] N75-29712
COATINGS
The application of the phenomenon of selective transfer to increase the durability of parts in fuel units [AD-A005975] N75-29445
COAXIAL FLOW
Thrust/drag analysis for a front fan nacelle having two separate co-axial exhaust streams --- for turbofan engines [ARC-CP-1311] N75-29049
On turbulent diffusion in coaxial jets of dissimilar gases with pressure gradient [NAL-TR-392T] N75-29350
COBALT ALLOYS
Structure and thermal cycling stability of a hafnium monocarbide reinforced directionally solidified cobalt-base eutectic alloy [NASA-TM-X-71751] N75-29242
COEFFICIENTS
Applications of the PARCOR coefficients for linear prediction of stationary processes --- partial autocorrelation coefficient for digital voice processing [TB-173] N75-29302
COLD TOLERANCE
Comparative characteristics of the main types of climatic clothing of Vostok Station personnel --- in Antarctic region [AD-A005876] N75-29788
COLLIMATORS
ESTOQ: A program for calculation of primary shock sources for avoidance of ray-effects with two dimensional S sub N calculations [REPT-4-17] N75-29363
COLLISION AVOIDANCE
Intermittent positive control computer algorithm for test bed experiments -- collision avoidance - aircraft guidance [AD-A009215] N75-29068
Analysis of problems in the application of radar sensors to automotive collision prevention [PB-240950/6] N75-29317
COLLISIONAL PLASMAS
Destabilization of hydromagnetic drift-Alfven waves in a finite pressure collisional plasma [AD-A006223] N75-29904
COLLISIONLESS PLASMAS
Dispersion relation for electron waves propagating in an isotropic plasma containing Maxwellian and suprathermal electrons N75-29881
Magnetic merging in a collisionless plasma [AD-A006408] N75-29905
COLOR TELEVISION
Digital video: Differential coding of PAL colour signals using same-line and two-dimensional prediction [BBC-RD-1975/20] N75-29282
COLORADO
A regional land use survey based on remote sensing and other data --- Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona [E75-10374] N75-29516
Rio Blanco massive hydraulic fracturing demonstration [PB-240849/0] N75-29614
COLORADO PLATEAU [US]
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs --- Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain [E75-10382] N75-29524
COMBINATORIAL ANALYSIS
F-89 hydraulic actuator combinatorial geometric representation [AD-A006435] N75-29101
COMBUSTION
Spherically symmetric optical discharge as analog of diffusion combustion in the mixture of fuel gases [AD-A005991] N75-29225
The characteristics of self sustained particulate boron combustion in air at ambient pressure [AD-A006039] N75-29233
COMBUSTION CHAMBERS
Investigation of the flows flowing from swirlers, 1 [NAL-TR-376] N75-29105
Influence of combustion phenomena on the pogo effect --- time delay parameter in combustion chamber transfer function N75-29989
Examination of combustion stability in a swirling flow combustion chamber --- small gas turbine engine N75-29991
COMBUSTION PHYSICS
Effect of gravity on methane-air combustion --- computer programs [NASA-CR-143350] N75-29211
Transition from deflagration to detonation in condensed phases [TT-74-50028] N75-29213
Analysis of the structure of the diffusion flames of hydrogen [AD-A006008] N75-29229
COMBUSTION PRODUCTS
Assessing and controlling the effect of aircraft on the environment: Pollution N75-29009
COMBUSTION STABILITY
Aerospace Research. Bi-monthly Bulletin No. 1974-1 --- influence of combustion and hydraulic systems on pogo effects, combustion stability in swirling flow, metal matrix composite materials [ESRO-TT-144] N75-29988
Examination of combustion stability in a swirling flow combustion chamber --- small gas turbine engine N75-29991
COMFORT
Human comfort response to random motions with a dominant vertical motion [NASA-TM-X-72691] N75-29774
COMMAND SERVICE MODULES
AST-6/CSM training console operations manual --- Apollo Soyuz test project [NASA-CR-144370] N75-29137
COMMUNICATION CABLES
Test plan/procedure for the checkout of the USA cable communications test configuration for the electromagnetic compatibility [EMC] tests [NASA-CR-144369] N75-29293
COMMUNICATION EQUIPMENT
FAA lightning protection study: Lightning protection requirements for AIL Mark 1 instrument landing system [AD-A009342] N75-29133
COMMUNICATION SATELLITES
Cost performance satellite design using queueing theory [NASA-TM-X-71770] N75-29155
COMMUNICATIONS TECHNOLOGY SATELLITE
Performance characteristics of the 12 GHz, 200 watt transmitter experiment package for CTS [NASA-TM-X-71773] N75-29284
COMPLEX SYSTEMS
Large-scale systems: Complexity, stability, reliability N75-29852
COMPONENT RELIABILITY
Results of irradiation tests on various electronic components [CNES-NT-11] N75-29325
COMPOSITE MATERIALS
Some trends in aircraft design: Structures N75-29014
Recent NASA progress in composites --- application to spacecraft and aircraft structures [NASA-TM-X-72713] N75-29188
COMPOSITE PROPELLANTS
Audible and ultrasonic acoustic emissions from composite solid propellants [AD-A005714] N75-29268
COMPOSITE STRUCTURES
Conceptual design study of advanced acoustic-composite nacelles [NASA-CR-132703] N75-29093
Behavior of four steel lightweight concrete composite beams under long lasting loads [CRIF-MT-93] N75-29479
COMPRESSIBILITY EFFECTS
The effect of compressibility on unstalled torsional flutter [ARC-R/M-3754] N75-29040
COMPRESSIBLE FLOW
Transonic data memorandum: Second-order method for estimating the subcritical pressure distribution on a two-dimensional aerofoil in compressible inviscid flow [ESDU-72025] N75-29029
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 1: A method of calculation [ARC-CP-1307-PT-1] N75-29046
COMPRESSION LOADS
Dynamic method of investigating the stability of a compressed rod --- structural stability [AD-A005965] N75-29499
COMPRESSION TESTS
Characterization of 2014-T651 aluminum alloy --- compression tests performed under various strain rates and stress states [AD-A006260] N75-29259
COMPRESSOR BLADES
Strength of axial flow compressor blade roots. Photoelastic stress analysis of the pin joint lug [NAL-TR-403] N75-29476
COMPRESSOR EFFICIENCY
Evaluation of the electrochemical O2 concentrator as an O2 compressor [NASA-CR-137688] N75-29436
COMPUTER ASSISTED INSTRUCTION
Computer assisted instructions in system reliability for logistics managers [AD-A006340] N75-29461
A TUTOR minicomputer system [AD-A005782] N75-29790
Optimizing the efficiency of computer-aided instruction [AD-A006424] N75-29797
COMPUTER DESIGN
Low cost computer subsystem for the Solar Electric Propulsion Stage [SEPS] [NASA-CR-120671] N75-29174
Data terminal standards and protocols [CRC-1275] N75-29298
COMPUTER PROGRAMMING
The evolution of the PROP6 orbit determination program and related topics --- satellite observations [RAE-TR-74164] N75-29150
An incore finite element program for research and teaching purposes --- matrix displacement method [ISD-162] N75-29486
OPTIM 2: A magic compatible large scale automated, minumum weight design program. Volume 2: Programmers manual [AD-A006412] N75-29497
ACS batch processing system. Volume 3: System and functional program description [AD-A005306] N75-29539
A program to plot bathymetric and magnetic anomaly profiles [AD-A006253] N75-29716
A production environment evaluation of interactive programming [AD-A006502] N75-29795
CAMAC: Group manipulation system [PB-240495/2] N75-29798
Characterization of optimality in convex programming without a constraint qualification [AD-A005903] N75-29800
Remote-terminal emulator [design verification model]: User's Manual [AD-A006193] N75-29804
Developments in computer aided software maintenance [AD-A005827] N75-29805
CARMONETTE. Volume 2. Data preparation --- ground combat simulation [AD-A007844] N75-29807
CARMONETTE. Volume 3. Technical documentation --- user manual for combat simulation [AD-A007845] N75-29808

THALIA: A one-dimensional magnetohydrodynamic stability program using the method of finite elements
[LRP-87/74] N75-29823
HYMNIA: Band matrix package for solving eigenvalue problems
[LRP-90/75] N75-29824
COMPUTER PROGRAMS
A technique for analysing the results of a flutter calculation --- exemplified for tail assembly with two degrees of freedom
[ARC-R/M-3765] N75-29054
Refinement and validation of two digital Microwave Landing System [MLS] theoretical models
[NASA-CR-132713] N75-29066
Intermittent positive control computer algorithm for test bed experiments --- collision avoidance - aircraft guidance
[AD-A009215] N75-29068
F-89 hydraulic actuator combinatorial geometric representation
[AD-A006435] N75-29101
Erosion in radial inflow turbines. Volume 5: Computer programs for tracing particle trajectories
[NASA-CR-134787] N75-29109
A computer program for helicopter rotor noise using Lowson's formula in the time domain
[NASA-TM-X-72759] N75-29116
Simulation verification techniques study
[NASA-CR-144356] N75-29132
Evaluation and study of advanced optical contamination, deposition, measurement, and removal techniques --- including computer programs and ultraviolet reflection analysis
[NASA-CR-144376] N75-29135
The Skynet 2 attitude sensor prediction and events program WINK 2
[RAE-TR-74091] N75-29147
Shuttle checkout software system application verification laboratory manual
[NASA-CR-144378] N75-29169
A fully coupled underexpanded afterburning rocket plume program (the AIPP code). Part 1: Analytical and numerical techniques
[AD-A006235] N75-29180
Effect of gravity on methane-air combustion --- computer programs
[NASA-CR-143350] N75-29211
Computer analysis of the mass spectra of gas mixtures
[AD-A006160] N75-29221
GOSPRE: A simple analytical program for computing grade of service in a heavily loaded communications network
[SRDE-74018] N75-29301
An improved numerical procedure for the parametric optimization of three dimensional scramjet nozzles --- supersonic combustion ramjet engines - computer programs
[NASA-CR-132695] N75-29359
ESTOQ: A program for calculation of primary shock sources for avoidance of ray-effects with two dimensional S sub N calculations
[REPT-4-17] N75-29363
A computer program for rigid pavement evaluation
[AD-A006140] N75-29496
A computer program for evaluation of solid waste resource recovery
[AD-A006356] N75-29583
Atmospheric transmission computer program CP
[NASA-TM-X-58137] N75-29602
A FORTRAN 4 program for the determination of the anomalous potential using stepwise least squares collocation
[AD-A006362] N75-29618
A hypothetical dialogue exhibiting a knowledge base for a program understanding system
[AD-A006294] N75-29799
A ray trace program for the CDC 1604 computer
[AD-A005321] N75-29869
COMPUTER SYSTEMS DESIGN
ACS batch processing system. Volume 1: System design document
[AD-A005304] N75-29537
COMPUTER SYSTEMS PROGRAMS
PANGLOSS: A system for reading and checking files
[NPL-NAC-59] N75-29794
Implementation of a mini-computer based information system. Part 18. A general file dump program for the Varian 620 computer --- for debugging and detection of machine failures
[AD-A008519] N75-29945
COMPUTER TECHNIQUES
Computational aerodynamics
N75-29013
User's guide for a revised computer program to analyze the LRC 16 foot transonic dynamics tunnel active cable mount system --- computer techniques - aircraft models
[NASA-CR-132692] N75-29130
Developments in computer aided software maintenance
[AD-A005827] N75-29805
Computer generation of natural language from a deep conceptual base
[AD-A005041] N75-29809
Computational understanding: Analysis of sentences and context
[AD-A005040] N75-29811
A phonological rules system --- computer techniques - speech recognition
[AD-A005826] N75-29813
Automatic generation of identification records for archives building --- information retrieval - documentation, computer techniques
[ISS-T-74/6] N75-29941
COMPUTERIZED DESIGN
Optimal control concepts in the design of turbine blades and blades
N75-29274
Computer-aided amplifier design in BASIC
[AD-A006370] N75-29331
OPTIM 2: A magic compatible large scale automated, minumum weight design program. Volume 2: Programmers manual
[AD-A006412] N75-29497
COMPUTERIZED SIMULATION
Statistical summary of the 1983 Los Angeles enroute center standard traffic model
[AD-A009011] N75-29073
Simulation model for New York air traffic control communications
[AD-A006426] N75-29083
Simulation verification techniques study
[NASA-CR-144356] N75-29132
A numerical simulation for the spiral raising to the 24 hour orbit by a low-thrust space vehicle with Solar Electric Propulsion [SEP] system
[NAL-TR-395] N75-29177
Efficiency of a phased array antenna as a function of phase shifter loss and mismatch due to mutual coupling
[PHL-1974-31] N75-29321
Comparison of some classes of MTI filters for a 3-pulse canceller with staggered PRF
[PHL-1974-38] N75-29323
Numerical simulation of flame induced aerodynamics in a coal-mine passageway, semi-empirical model
[PB-240843/3] N75-29379
A GASP 4 simulation of tactical air interdiction using a choice of weapons loads and continuously changing weather conditions
[AD-A006349] N75-29417
A simulation of the Emergency Clinic and Department of Primary Care at the Wright-Patterson AFB Medical Center
[AD-A006345] N75-29750
Simulation of digital systems consisting of elements with propagation delay time
[NAL-TR-391] N75-29792
CARMONETTE. Volume 1. General description --- ground combat simulation, target acquisition, and mathematical models
[AD-A007843] N75-29806
CARMONETTE. Volume 2. Data preparation --- ground combat simulation
[AD-A007844] N75-29807
CARMONETTE. Volume 3. Technical documentation --- user manual for combat simulation
[AD-A007845] N75-29808
Control techniques for production processes using Bayesian estimation and exponential smoothing
[PB-241142/9] N75-29810
A computer simulation of release parameter effects upon bomb impact distributions
[AD-A006347] N75-29844
An estimator for an anti-aircraft gun fire control system
[AD-A005763] N75-29858
Computer simulation of plasma and N-body problems
[NASA-CR-143286] N75-29894
CONCRETES
Behavior of four steel lightweight concrete composite beams under long lasting loads
[CRIF-MT-93] N75-29479
Fatigue behavior of welded reinforcement in reinforced concrete beams
[PB-240367/3] N75-29500
CONDENSING
Experiments of nonequilibrium, nonstationary expansion of water vapour/carrier gas mixture in a shock tube
[UTIAS-195] N75-29863
CONFERENCES
NASA/University Conference on Aeronautics
[NASA-SP-372] N75-29001
Current status in aerospace medicine --- conference on habitability of spacecraft environments and environmental control
[AGARD-CP-154] N75-29722
Large scale dynamic systems
[NASA-SP-371] N75-29845
Future utilization of space: Silverton Conference on material science and phase transformations in zero-gravity, summary of proceeding
[NASA-CR-141936] N75-29908
CONICAL FLOW
Measurements at the leeward side of a cone at large incidences in supersonic flow
[VTH-186] N75-29370
CONIFERS
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
CONSECUTIVE EVENTS
The Skynet 2 attitude sensor prediction and events program WINK 2
[RAE-TR-74091] N75-29147
CONSERVATION LAWS
Conservation forms of gas dynamic equations
N75-29993
CONSTRAINTS
Characterization of optimality in convex programming without a constraint qualification
[AD-A005903] N75-29800
CONSTRUCTION MATERIALS
Some trends in aircraft design: Structures
N75-29014
CONSUMABLES [SPACECREW SUPPLIES]
Dinner for a cosmonaut --- development of freeze dried foods
[NASA-TT-F-16465] N75-29772
Space shuttle/food system study. Volume 1: Technical volume, oven study
[NASA-CR-144366] N75-29778
CONTACT DERMATITIS
Evaluation of proposed electroplated HGU-4-/P frames --- to determine the incidence of resulting nickel dermatitis
[AD-A006121] N75-29749
CONTAMINATION
Removing trace contaminants from sampling cylinders
[AD-A006138] N75-29397
CONTINENTAL SHELVES
Taking cores from unconsolidated sediments of the shelf area using a vibration-hammer corer
[BLL-M-23679-[5828.4F]] N75-29705
CONTINENTS
Utilization of Skylab [EREP] system for appraising changes in continental migratory bird habitat
[E75-10361] N75-29503
CONTINUOUS WAVE LASERS
A heterodyne detection FM-CW laser radar using a 10 micrometers source
[AD-A005865] N75-29419
CONTINUUM MECHANICS
Magnetic fluids: Magnetic forces and pumping mechanisms
[AD-A006323] N75-29867
CONTROL BOARDS
AST-6/CSM training console operations manual --- Apollo Soyuz test project
[NASA-CR-144370] N75-29137
CONTROL THEORY
Use of a microprocessor in a supervisory control application
[AD-A006119] N75-29791
Control techniques for production processes using Bayesian estimation and exponential smoothing
[PB-241142/9] N75-29810
Complete identification of a class of nonlinear systems from steady state frequency response
[AD-A005829] N75-29814
A hybrid approach to optimal control problems with bounded state. Part 1: Theory
[AD-A006191] N75-29815
Survey of decentralized control methods --- for large scale dynamic systems
N75-29849
Some notions of decentralization and coordination in large-scale dynamic systems
N75-29854
Some aspects of control of a large-scale dynamic system
N75-29855
CONTROL VALVES
Flow mechanisms and noise in control valves with model tests in the near sonic and supersonic range
[BLL-CE-TRANS-6607-[9022.09]]
N75-29347
CONTROLLABILITY
Decentralized regulation of dynamic systems --- for controlling large scale linear systems
N75-29851
CONVECTION CLOUDS
On the latitudinal variation of the characteristics of the inversion layers in the region of ITCZ in the east Atlantic
N75-29647
Cloud cover dynamics over the tropical Atlantic during the GATE first observing period
N75-29648
Observations on convective clouds over the tropical Atlantic
N75-29653
On microstructure of clouds in the eastern zone of the Atlantic
N75-29654

On the effects of thermodynamic conditions on the evolution of convective clouds in the tropical zone of east Atlantic N75-29660
Rapid structural changes in an asymmetrical tropical depression N75-29661
CONVECTIVE HEAT TRANSFER
Developments in convective heat transfer models featuring seamless and selected detail surfaces, employing electroless plating [NASA-CR-144364] N75-29356
An investigation of interactions between double clouds using a two dimensional numerical model [AD-A006255] N75-29703
CONVERGENCE
On remainders and the convergence of cardinal spline interpolation for almost periodic functions [AD-A006544] N75-29825
CONVERTERS
Thyristor control of an inductive capacitive converter for charging capacitive energy tanks [AD-A006080] N75-29333
CONVEXITY
F-convex functions [AD-A005900] N75-29836
CONVEYORS
Passenger conveyor economics: Costs, capacity and user benefits [TT-7409] N75-29069
Behavioural observations of passengers boarding a slow speed conveyor [TT-7411] N75-29759
COOLANTS
Safety evaluation of the energy research and development administration's loss of fluid test facility. Project no. 394 [PB-241456/3] N75-29884
COOLING
The prophylactic effect of headcooling on coal miner's cramps. 1: Electroencephalographic observation on rabbits during head-cooling under the hot and humid environment [NASA-TT-F-16448] N75-29739
COOLING SYSTEMS
Cryostat system for temperatures on the order of 2 deg K or less [NASA-CASE-NPO-13459-1] N75-29277
Radiation cooler for 10 micrometer wavelength engineering model receiver model no. 7172, serial no. 201 [NASA-CR-144662] N75-29362
COORDINATE TRANSFORMATIONS
Conservation forms of gas dynamic equations N75-29993
COPPER ALLOYS
Development of sputtered techniques for thrust chambers [NASA-CR-134824] N75-29248
CORE SAMPLING
Taking cores from unconsolidated sediments of the shelf area using a vibration-hammer corer [BLL-M-23679-[5828.4F]] N75-29705
CORN
Investigation of Skylab data — Locke Township, Ingham County, Michigan [E75-10363] N75-29505
Recognition map analysis and crop acreage estimation using Skylab EREP data — Michigan [E75-10369] N75-29511
Recognition map analysis and crop acreage estimation [E75-10375] N75-29517
Recognition map analysis and crop acreage estimation [E75-10376] N75-29518
Recognition map analysis and crop acreage estimation [E75-10380] N75-29522
CORROSION PREVENTION
Evaluation of Ni-Cd cell covers. Results of testing of covers with protected brazing fillet [NLR-TR-75033-C] N75-29452
CORROSION TESTS
Hot corrosion evaluation of aluminide coated superalloys in support of an ASTM Round Robin program [NASA-TM-X-71734] N75-29240
Hot corrosion in burner gas at 1200 C [NASA-TT-F-16509] N75-29245
COS-B SATELLITE
Satellite operations model extension — COS-B closed loop model [ESS/SS-617] N75-29146
COSMIC RAYS
Geophysics and Space data Bulletin. Volume 11, no. 3, third quarter 1974 [AD-A006402] N75-29501
Width measurements on short tracks of cosmic ray nuclei in nuclear emulsion [LUIP-CR-74-13] N75-29987
COSMONAUTS
Space food preparation and packaging. A menu for cosmonauts and 'space' bread [NASA-TT-F-16467] N75-29720
Dinner for a cosmonaut — development of freeze dried foods [NASA-TT-F-16465] N75-29772
COST ANALYSIS
Passenger conveyor economics: Costs, capacity and user benefits [TT-7409] N75-29069
Optimization of the time between aircraft overhauls by minimizing maintenance cost [AD-A006505] N75-29100
Evaluation of proposed criteria to be used in the selection of candidated for reliability improvement warranties — cost analysis - government procurement/armed forces [United States] [AD-A006335] N75-29460
Engineering and cost study of air pollution control for the petrochemical industry. Volume 2: Acrylonitrile manufacture [PB-240986/0] N75-29599
Cost accounting at large research centers [BLL-RAE-TRANS-5207-[1765]] N75-29936
COST EFFECTIVENESS
Cost performance satellite design using queueing theory [NASA-TM-X-71770] N75-29155
COST ESTIMATES
Cost estimating relationships for predicting life cycle costs of inertial measurement unit maintenance [AD-A006344] N75-29457
COSTS
Designing a manual cost data base [AD-A006508] N75-29948
COUNTING
Comparative study of counting methods by digital simulation [NAL-TR-408] N75-29789
COUPLED MODES
A wide-angle scan matching technique for an infinite plane phased array antenna [PHL-1974-33] N75-29322
COVARIANCE
Vertical structure of hemispheric temperature spectral components [DM-13] N75-29686
Identification of continuous time dynamical systems with unknown noise covariance [AD-A005885] N75-29816
CRACK INITIATION
Flight-Simulation tests on notched elements — fatigue and crack initiation [NLR-TR-74033-U] N75-29488
CRACK PROPAGATION
Crack growth in Ti-8Al-1Mo-1V with real-time and accelerated flight by flight loading [NASA-TM-X-72754] N75-29092
Fatigue crack propagation data for titanium sheet alloys: IMI 318 [NLR-TR-74048-U] N75-29252
Fractography of fatigue crack propagation in 2024-T3 and 7075-T6 aluminium alloys tested in air and vacuum [NLR-TR-74094-U] N75-29253
Finite element fracture mechanics analysis of two-dimensional and axisymmetric elastic and elastic-plastic cracked structures — for submarine hulls [AD-A005880] N75-29261
Fatigue crack propagation in thin sheets of L73 under constant strain amplitude [ARC-CP-1314] N75-29485
CRAMPS
The prophylactic effect of headcooling on coal miner's cramps. 1: Electroencephalographic observation on rabbits during head-cooling under the hot and humid environment [NASA-TT-F-16448] N75-29739
CRANES
West German self-propelled cranes with hydraulic booms [AD-A005948] N75-29439
CRITICAL POINT
Vapour pressures of pure substances up to their critical points. 2: C2 to C6 alkenes [monoolefines] [ESDU-73008] N75-29201
Vapour pressures of pure substances up to their critical points. 3: C6 to C10 alkylbenzenes [ESDU-73029] N75-29202
Normal melting points, boiling points and critical points of n-alkyl esters of monobasic n-alkanoic acids [ESDU-71001] N75-29203
Normal melting points, boiling points and critical points of n-alkyl aldehydes and ketones [ESDU-71023] N75-29206
Vapour pressures of pure substances up to their critical points. 1: C1 to C8 alkanes [ESDU-72028] N75-29210
CRITICAL TEMPERATURE
Normal melting points, boiling points and critical points of monobasic alkanoic acids [ESDU-72006] N75-29209
CROP GROWTH
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs — Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain [E75-10382] N75-29524
World climate and world food systems 1: Heyuppskera, an heuristic model for hay yield in Iceland [PB-240870/6] N75-29690
CROP IDENTIFICATION
Investigation of Skylab data — Locke Township, Ingham County, Michigan [E75-10363] N75-29505
Detection of crop mark contrast for archaeological surveys — Great Britain [E75-10364] N75-29506
Recognition map analysis and crop acreage estimation using Skylab EREP data — Michigan [E75-10366] N75-29508
Recognition map analysis and crop acreage estimation using Skylab EREP data — Michigan [E75-10369] N75-29511
Recognition map analysis and crop acreage estimation [E75-10375] N75-29517
Recognition map analysis and crop acreage estimation [E75-10376] N75-29518
Recognition map analysis and crop acreage estimation [E75-10380] N75-29522
Crop identification technology assessment for remote sensing [CITARS]. Volume 6: Data processing at the laboratory for applications of remote sensing [NASA-CR-144374] N75-29536
CROSS FLOW
Crossflow in two-dimensional asymmetric nozzles [NASA-TN-D-7999] N75-29365
CRUDE OIL
Biodegradation of some polynuclear aromatic petroleum components by marine bacteria [AD-A006346] N75-29733
CRYOGENIC FLUIDS
Bubble nucleation at real surfaces with no pre-existing gaseous phase [OUEL-1110/74] N75-29279
CRYOGENIC ROCKET PROPELLANTS
Design and evaluation of thermodynamic vent/screen baffle cryogenic storage system — for space shuttles, space tugs, and spacelab [NASA-CR-134810] N75-29278
CRYOSTATS
Cryostat system for temperatures on the order of 2 deg K or less [NASA-CASE-NPO-13459-1] N75-29277
CRYSTAL DEFECTS
On the determination of the photo-ionization energy and the concentration of defects created by nuclear radiation in silicon diodes [FOA-B-30003-A3] N75-29913
CRYSTAL GROWTH
The study of single crystals for space processing and the effect of zero gravity [NASA-CR-143271] N75-29914
Research on semiconductor physics in the Electrophysical Department, 25th anniversary of the founding of V. I. Lenin Kishinev State University — crystal growth [AD-A006092] N75-29927
CRYSTAL STRUCTURE
Characterization of silicon carbide [AD-A006409] N75-29932
CUES
Deterministic multiple cue learning. Part 1: Effects of cue intercorrelation and presentation order [IZF-1974-20-PT-1] N75-29760
On context effects in short term retention [IZF-1974-28] N75-29761
CUMULONIMBUS CLOUDS
Case study of the physical structure of individual cumulo nimbus [mission 226-4, type 8B2] N75-29663
CUMULUS CLOUDS
On the structure and organization of clouds in the GATE area N75-29655
On the structure of the cumulus clouds at the equator in connection with meteorological conditions according to the stereophotographic measurements on board the R/V Akademik Kurchatov N75-29656
CURRENT DISTRIBUTION
Mathematical analysis of current distribution in corrosion cells with circular geometry [AD-A006553] N75-29556
CYCLIC LOADS
Fracture control method for composite tanks with load sharing liners [NASA-CR-134758] N75-29449
CYCLONES
Atmospheric disturbances over the Atlantic GATE area as seen from satellite data — cyclones N75-29642
Rapid structural changes in an asymmetrical tropical depression N75-29661

CYLINDERS
Removing trace contaminants from sampling cylinders
[AD-A006138] N75-29397
CYLINDRICAL SHELLS
Experimental test of the load bearing capacity of smooth glass fibre reinforced plastic hollow cylinders subjected to external hydrostatic pressure
[BLL-NEL-TT-2564-(6075.461)] N75-29463
Response of thin-walled cylinders to aerodynamic excitation, part 1
[TT-7413-PT-1] N75-29480
Response of thin-walled cylinders to aerodynamic excitation, part 2 --- appendices
[TT-7413-PT-2] N75-29481

D

DAMPING
The incremental solution of some basic problems in elastic stability --- using Newton-Raphson method and nonlinear equations
[NLR-TR-74005-U] N75-29490
DAMPING TESTS
Vibration damping of satellite structures
[REPT-251-CA/53] N75-29167
Vibration damping of satellite structures. Report on tests
[REPT-828-CA/40] N75-29168
DATA ACQUISITION
Airborne meteorological instrumentation system and data reduction
[AD-A009665] N75-29636
Federal plan for environmental data buoys
[COM-75-10511/4] N75-29699
ATS-6 millimeter wavelength propagation experiment --- a data acquisition system
[NASA-CR-143829] N75-29944
DATA BASES
Designing a manual cost data base
[AD-A006508] N75-29948
DATA COMPRESSION
Study of efficient video compression algorithms for space shuttle applications
[NASA-CR-137708] N75-29294
DATA CORRELATION
Further studies of ATCRBS based on ARTS-3 derived data --- aircraft guidance - digital data/data correlation
[AD-A005568] N75-29079
On a principle of validation of the meteorological observation results in GATE-74 N75-29651
Calculations for interpretation of solar vector magnetograph data --- sunspots - spectrum analysis/data correlation
[NASA-CR-120685] N75-29986
DATA LINKS
DABS link performance considerations
[AD-A009429] N75-29078
Experiment definition phase shuttle laboratory: LDRL-10.6 experiment
[NASA-CR-144658] N75-29161
Experiment definition phase shuttle laboratory LDRL-10.6 experiment --- applying optical communication
[NASA-CR-144656] N75-29164
Data link short-message cockpit display test
[AD-A005988] N75-29285
DATA MANAGEMENT
Functional design specification for Stowage List And Hardware Tracking System [SLAHTS] --- space shuttles
[NASA-CR-144368] N75-29942
Functional design specification for the problem data system --- space shuttle
[NASA-CR-144358] N75-29943
DATA PROCESSING
Users guide for the shuttle mass properties automated system
[NASA-CR-144371] N75-29145
Study of meteorological data processing methods
[ESRO-SP-85] N75-29689
A model for data secure systems, part 2
[AD-A006276] N75-29803
Optimal linear and nonlinear feature extraction based on the minimization of the increased risk of misclassification --- Bayes theorem - statistical analysis/data processing
[NASA-CR-144385] N75-29821
Development of solar wind shock models with tensor plasma pressure for data analysis
[NASA-CR-143301] N75-29978
DATA PROCESSING EQUIPMENT
Evaluation of an acoustical X-Y digitizer for use in biomedical data reduction tasks
[AD-A005293] N75-29746
DATA PROCESSING TERMINALS
Data terminal technology, present and future. Volume 1: State-of-the-art
[CRC-1276-1-VOL-1] N75-29296
Data terminal technology, present and future. Volume 2. Technology forecasting and assessment
[CRC-1276-2] N75-29297
Data terminal standards and protocols
[CRC-1275] N75-29298
Remote-terminal emulator [design verification model]: User's Manual
[AD-A006193] N75-29804
DATA REDUCTION
Image processing and data reduction of Apollo low light level photographs
[NASA-CR-144659] N75-29389
Associative array processing for topographic data reduction
[AD-A006198] N75-29543
Evaluation of an acoustical X-Y digitizer for use in biomedical data reduction tasks
[AD-A005293] N75-29746
DATA STORAGE
PANGLOSS: A system for reading and checking files
[NPL-NAC-59] N75-29794
DATA TRANSMISSION
A study of bifurcated routing in a data network and the effect of isarithmic flow control in this context
[NPL-COM-72] N75-29305
DC 8 AIRCRAFT
Engineering simulation evaluation of the two-segment noise abatement approach in the Douglas DC-8-61
[NASA-CR-137665] N75-29121
DECIDUOUS TREES
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
DECISION MAKING
The decision tree approach to classification
[NASA-CR-141930] N75-29528
DECONTAMINATION
Feasibility of 5 gpm dynactor/magnetic separator system to treat spilled hazardous materials
[PB-241080/1] N75-29590
DEEP SPACE NETWORK
The deep space network
[NASA-CR-143289] N75-29289
DEFENSE PROGRAM
The impact of metrication on the Defense standardization program
[AD-A006038] N75-29280
DEFLAGRATION
Transition from deflagration to detonation in condensed phases
[TT-74-50028] N75-29213
DEFORMATION
Wind tunnel model deformation measuring system
[AD-A006390] N75-29138
Deformation and failure under multiaxial stresses: A survey of laboratory techniques and experimental data
[ARC-CP-1306] N75-29484
DEGREES OF FREEDOM
Extension of the method for predicting six-degree-of-freedom store separation trajectories at speeds up to the critical speed to include a fuselage with noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment --- external stores - attack aircraft
[AD-A005822] N75-29071
DELPHI METHOD [FORECASTING]
Study plan to identify long term national telecommunications need and priorities applying Delphi techniques [handbook] --- technological forecasting - United States of America
[NASA-CR-143833] N75-29299
DEMAND [ECONOMICS]
Oil and US policy
[AD-A006473] N75-29558
DENDRITIC CRYSTALS
Silicon ribbon study program --- dendritic crystals for use in solar cells
[NASA-CR-134821] N75-29910
DENSITY DISTRIBUTION
Some simple methods for the unique assignment of a density distribution to a harmonic function
[AD-A006026] N75-29615
DESERTS
Desert storage test program
[AD-A006103] N75-29454
DESIGN ANALYSIS
Preliminary design study of a quiet, high flow fan [QHF] stage --- turbofans - quiet engine program
[NASA-CR-134780] N75-29433
Design of a 9 inch cycloidal propeller model unit and some experimental results
[AD-A005768] N75-29442
The structure of robust observers
[NASA-TM-X-64950] N75-29819
Designing a manual cost data base
[AD-A006508] N75-29948
DETONATION
Propagation of the flame within a narrow tube
[NAL-TR-394] N75-29212
DETONATION WAVES
On construction of the closed theory of spinning detonation
[AD-A005993/1] N75-29224
DEUTERIUM COMPOUNDS
Application of deuterized compounds for the study of kinetics and mechanism of the thermal conversions of hydrocarbons
[AD-A006007] N75-29184
Investigation of DF laser propagation
[AD-A005631] N75-29608
DEUTERON IRRADIATION
Experiments --- studies using polarized beams and deuteron irradiation N75-29876
DIAGNOSIS
Some preliminary experiments in the use of a programmable videotape recorder as an automated history-taking device in a chest clinic
[NPL-COM-73] N75-29745
DIELECTRICS
A wide-angle scan matching technique for an infinite plane phased array antenna
[PHL-1974-33] N75-29322
DIFFERENTIAL INTERFEROMETRY
Fundamentals of holographic interferometry
[REPT-182] N75-29409
DIFFUSION COEFFICIENT
Coefficient of diffusion for a uniform parallel panel
[ESDU-02.05.01] N75-29468
DIFFUSION FLAMES
Spherically symmetric optical discharge as analog of diffusion combustion in the mixture of fuel gases
[AD-A005991] N75-29225
Analysis of the structure of the diffusion flames of hydrogen
[AD-A006008] N75-29229
Turbulent mixing in non-reactive and reactive flows
[AD-A006322] N75-29376
DIGITAL COMPUTERS
Digital fuel controller for lift jet engine
[NAL-TR-389] N75-29122
Digital flight control system redundancy study --- fly by wire control - aircraft guidance
[AD-A006411] N75-29129
Interfacing a 24-point analog recorder to a computer controlled telemetry line --- for water pollution monitoring
[PB-241086/8] N75-29403
DIGITAL DATA
Further studies of ATCRBS based on ARTS-3 derived data --- aircraft guidance - digital data/data correlation
[AD-A005568] N75-29079
Digital video: Differential coding of PAL colour signals using same-line and two-dimensional prediction
[BBC-RD-1975/20] N75-29282
Apparatus and programs for digital analysis of fluctuating quantities in turbulent flow
[IC-AERO-74-09] N75-29793
DIGITAL SIMULATION
Refinement and validation of two digital Microwave Landing System [MLS] theoretical models
[NASA-CR-132713] N75-29066
Preliminary two-dimensional area navigation terminal simulation
[AD-A006263] N75-29076
Comparative study of counting methods by digital simulation
[NAL-TR-408] N75-29789
Digital simulation of V/STOL aircraft for autopilot research N75-29853
DIGITAL SYSTEMS
Data link short-message cockpit display test
[AD-A005988] N75-29285
Simulation of digital systems consisting of elements with propagation delay time
[NAL-TR-391] N75-29792
DIGITAL TECHNIQUES
Aircraft engine speed and fuel flow signal conditioner with digital output
[ARL/ME-NOTE-354] N75-29111
DIHEDRAL ANGLE
The effect of wing dihedral and section suction distribution on vortex bursting
[NASA-TM-X-72745] N75-29091
DIODES
On the determination of the photo-ionization energy and the concentration of defects created by nuclear radiation in silicon diodes
[FOA-B-30003-A3] N75-29913
DIRECT CURRENT
A thyristor dc switch
[AD-A005957] N75-29342
Electrical characteristics of a free-burning direct-current argon arc operating between 90 and 563 kilowatts with two types of cathodes
[NASA-TN-D-8032] N75-29896
DISCOLORATION
Chemical controls for dry heat sterilization
[NASA-TT-F-16321] N75-29719

DISPERSING
Dispersion relation for electron waves propagating in an isotropic plasma containing Maxwellian and suprathermal electrons
N75-29881

DISPERSIONS
Calculations of the mean regional dispersion of a radioactive gas emitted from a continuous source
[AC-29] N75-29685
Light absorption in suspensions of large soft particles of arbitrary shape
[AD-A005970] N75-29893

DISPLACEMENT
On the question of static computation of saddle-shapped suspended coverings according to a discrete diagram
[AD-A005997] N75-29498

DISPLACEMENT MEASUREMENT
Response analysis of a clamped plate to boundary layer pressure fluctuations
[NAL-TR-401] N75-29475

DISPLAY DEVICES
Results of an aircraft visibility questionnaire concerned with the estimated benefits of airborne proximity warning indicator systems
[AD-A009884] N75-29061
Data link short-message cockpit display test
[AD-A005988] N75-29285
A scan converter radar display system
[AD-A005881] N75-29316

DISTANCE
Allocation methodology. Distance determinations and population catchment determinations, and their applicability to practical planning --- urban planning - information systems
[NASA-TT-F-16495] N75-29856

DISTRIBUTION FUNCTIONS
The asymptotic behaviour of the Hurst range
[RR-164/PSC/3] N75-29841

DIURNAL VARIATIONS
Diurnal and semidiurnal variations by meteorological measurements on equator
N75-29644

DOCUMENTATION
Automatic generation of identification records for archives building --- information retrieval - documentation, computer techniques
[ISS-T-74/6] N75-29941

DOPPLER RADAR
Spectral analysis of Doppler MLS video data
[AD-A006436] N75-29072
Tests with coaxial TACAN antenna at Doppler very high frequency omnirange [VOR]
[AD-A010008] N75-29080
Digital Doppler processing using Walsh and quantized Fourier transforms
[AD-A006116] N75-29313

DRAG REDUCTION
Opportunities for aerodynamic-drag reduction
N75-29016

DRAINAGE PATTERNS
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521

DRIFT RATE
Ship drift components: Means and standard deviations
[AD-A006470] N75-29708

DRILLING
The behavior of an axially loaded drilled shaft under sustained loading
[PB-240328/5] N75-29495

DROP SIZE
Drop formation from single nozzles at high nozzle velocities in liquid-liquid systems
[BLL-RTS-9364] N75-29349

DROPS [LIQUIDS]
The impact between a liquid drop and an elastic half-space
[PB-241155/1] N75-29378

DUST
Identification, tracking, and sources of Saharan dust: An inquiry using SMS
N75-29664

DYNAMIC CHARACTERISTICS
Dynamic method of investigating the stability of a compressed rod --- structural stability
[AD-A005965] N75-29499
Identification of continuous time dynamical systems with unknown noise covariance
[AD-A005885] N75-29816

DYNAMIC MODELS
An informal paper on large-scale dynamic systems
N75-29848
Survey of decentralized control methods --- for large scale dynamic systems
N75-29849

DYNAMIC RESPONSE
Shear and moment response of the airplane wing to nonstationary turbulence
[NAL-TR-404T] N75-29032
A direct time history study of the response of an airplane to nonstationary turbulence
[AD-A006159] N75-29102
A simulation study of active feedback supression of dynamic response in helicopter rotor blades
[NASA-CR-132711] N75-29127
Dynamic response of fluid-filled shells
N75-29273
Response analysis of a clamped plate to boundary layer pressure fluctuations
[NAL-TR-401] N75-29475
Response of thin-walled cylinders to aerodynamic excitation, part 1
[TT-7413-PT-1] N75-29480
Response of thin-walled cylinders to aerodynamic excitation, part 2 --- appendices
[TT-7413-PT-2] N75-29481
Large scale dynamic systems
[NASA-SP-371] N75-29845
Some notions of decentralization and coordination in large-scale dynamic systems
N75-29854
Some aspects of control of a large-scale dynamic system
N75-29855

DYNAMIC STABILITY
Large-scale systems: Complexity, stability, reliability
N75-29852

DYNAMIC STRUCTURAL ANALYSIS
Analysis of plastic models of ship structures using holograph and strain gages --- holographic displacement and vibration analyses
[AD-A006269] N75-29399
Optimum configuration of truss structures --- using the finite element displacement method
[NAL-TR-388T] N75-29471

E

EARLY WARNING SYSTEMS
Engineering studies in support of the implementation plan for the distress alerting and locating system DALS, volume 1
[AD-A005273] N75-29082

EARTH HYDROSPHERE
How to build Gulliver's watch [biosphere model]
[NASA-TT-F-16455] N75-29606

EARTH RESOURCES
Information content of the data obtained by remote sensing of the parameters of the environment and the earth's resources from space
[NASA-TT-F-16435] N75-29533

EARTHQUAKES
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
Identification of earthquakes and underground explosions
[AD-A006467] N75-29621
Seismic discrimination
[AD-A006194] N75-29624

ECHOES
Preliminary results of acoustic echo sounding of the marine boundary layer during GATE
N75-29665

ECLIPSES
Interpretation of surface features of Europa obtained from occultations by Io --- astronomical observations - Jupiter [planet]
[NASA-CR-143273] N75-29958

ECONOMIC ANALYSIS
Economic analysis and new starts of federal government commercial or industrial activities
[AD-A006359] N75-29950
Technical progress and industrial development in a developing economy --- urban development
[AD-A005734] N75-29951

ECONOMIC DEVELOPMENT
The macroeconomic impacts of federal pollution control programs
[PB-240979/5] N75-29591

ECONOMIC FACTORS
Current and future opportunities in aeronautical engineering
N75-29004
The long term energy problem and aeronautics
N75-29012
The MCL-Thurow model supplement
[PB-241113/0] N75-29952
Economic impact of shortages on the fertilizer industry
[PB-240418/4] N75-29953

ECOSYSTEMS
Ecological characteristics of the Boardman Site and environs, Morrow County, Oregon --- environmental impact of electrical power generating stations
[PB-241071/0] N75-29502

EDUCATION
Aeronautics in the American Society
N75-29002
Some developing concepts of engineering education
N75-29003
Current and future opportunities in aeronautical engineering
N75-29004
The predicament of aeronautical engineering education and what we can do about it
N75-29005
The predicament of aeronautical engineering education and what we can do about it
N75-29006
The ME/DE degree at the University of Kansas
N75-29017
A proposed university/industry/government cooperative aero educational program
N75-29018
University/government/industry relations in aeronautics
N75-29019
Curriculum for modern aeronautics
N75-29023
Engineering education for the 1980's: A speculation
N75-29024
TAT welding technology training program
[PB-241047/0] N75-29447
Training of enlisted women as jet aircraft maintenance specialists
[AD-A006434] N75-29771

EIGENVALUES
HYMNIA: Band matrix package for solving eigenvalue problems
[LRP-90/75] N75-29824
Stabilization of kink disturbances by inhomogeneous magnetic fields
[TRITA-EPP-75-01] N75-29899

EJECTION INJURIES
Some studies relating to limb flailing after an emergency escape from an aircraft
[AD-A005699] N75-29732

EJECTION SEATS
Some studies relating to limb flailing after an emergency escape from an aircraft
[AD-A005699] N75-29732

ELASTIC DEFORMATION
Information on the use of data items on struts
[ESDU-01.01.00] N75-29464

ELASTIC PLATES
Forced extensional vibrations of plates
[AD-A006150] N75-29491

ELASTIC PROPERTIES
On the complementary energy theorem in nonlinear elasticity theory
[WTHD-72] N75-29478

ELASTOMERS
Flame resistant elastomeric polymer development -- for use in space shuttle instrument packaging
[NASA-CR-144362] N75-29264

ELECTRIC ARCS
Electric arc light source having undercut recessed anode
[NASA-CASE-ARC-10266-1] N75-29318

ELECTRIC CURRENT
Low fluence calculation of photoelectron flux densities outside an emitting sphere
[AD-A005825] N75-29866

ELECTRIC ENERGY STORAGE
Thyristor control of an inductive capacitive converter for charging capacitive energy tanks
[AD-A006080] N75-29333

ELECTRIC EQUIPMENT
Airborne electronics for automated flight systems
N75-29011

ELECTRIC GENERATORS
Analysis of large power systems
N75-29850

ELECTRIC POWER PLANTS
Ecological characteristics of the Boardman Site and environs, Morrow County, Oregon --- environmental impact of electrical power generating stations
[PB-241071/0] N75-29502
Construction of Philadelphia Electric Company's Fulton generating station, units 1 and 2. Dockets nos. 50-463 and 50-464 --- environmental impact statement
[PB-241165/0] N75-29551
Development document for effluent limitations guidelines and new source performance standards for the steam electric power generating point source category
[PB-240853/2] N75-29575
Report to Congress on control of sulfur oxides
[PB-241021/5] N75-29597

ELECTRIC POWER TRANSMISSION
Power interrupt equipment
[AD-A010009] N75-29319

ELECTRIC PROPULSION
Power processing for electric propulsion
[NASA-TM-X-71775] N75-29172
Superconducting windings --- for marine electric propulsion
[AD-A006476] N75-29337

ELECTRIC WELDING
TAT welding technology training program
[PB-241047/0] N75-29447

ELECTRICAL RESISTIVITY
The effect of gases on the conductive properties of organic semiconductors. Part 5: Results for films of chloranil, phenanthrene, phenazine, phtalocyanine [metal free] and crystal violet
[CL-1974-13-PT-5] N75-29917

Electrical and thermoemission properties of alloys lanthanum and cerium hexaborides with transition metals
[AD-A005980] N75-29921

ELECTROCARDIOGRAPHY
Electrocardiographic aspects of exercise testing
N75-29738

ELECTROCHEMICAL CORROSION
Evaluation of Ni-Cd cell covers. Results of testing of covers with protected brazing fillet
[NLR-TR-75033-C] N75-29452
Mathematical analysis of current distribution in corrosion cells with circular geometry
[AD-A006553] N75-29556

ELECTROCHEMISTRY
Electrochemical measurement of carbon potential. Part 4: Studies on some sodium-steel systems at 910K
[RD/B/N-3157] N75-29217
Evaluation of the electrochemical O2 concentrator as an O2 compressor
[NASA-CR-137688] N75-29436

ELECTRODEPOSITION
An ellipsometric investigation of the underpotential deposition of lead on gold
[AD-A005915] N75-29257

ELECTRODES
An experimental study of reaction profiles in porous electrodes.
[AD-A005773] N75-29341
An investigation of the influence of the wet surface area of a positive electrode on the energy conversion efficiency during the electrical explosion of conductors
[AD-A005971] N75-29343
Effect of the electrolyte temperature during charging of plates on the characteristics of electrodes and cells of lead acid automotive storage batteries
[AD-A006079] N75-29565

ELECTROLYTIC CELLS
Mathematical analysis of current distribution in corrosion cells with circular geometry
[AD-A006553] N75-29556

ELECTROMAGNETIC COMPATIBILITY
Test plan/procedure for the checkout of the USA cable communications test configuration for the electromagnetic compatibility [EMC] tests
[NASA-CR-144369] N75-29293

ELECTROMAGNETIC FIELDS
Space shuttle electromagnetic environment experiment. Phase A: Definition study
[NASA-CR-143834] N75-29162
Generation of standard EM fields for calibration of power density meters 20 kHz to 1000 MHz
[COM-75-10395/2] N75-29404

ELECTROMAGNETIC INTERFERENCE
Electromagnetic interference measurements in electronic voice switching equipment areas
[AD-A008925] N75-29288

ELECTROMAGNETIC NOISE
The accuracy of far-field noise obtained by the mathematical extrapolation of near-field noise data
[NASA-TM-X-62434] N75-29067

ELECTROMAGNETIC PULSES
Induced currents on two dimensional electromagnetic planar structures
[AD-A005733] N75-29339
Radiation induced electron emission --- from solid materials
[AD-A006396] N75-29930

ELECTROMAGNETIC RADIATION
A study of energetic particle precipitation effects associated with discrete VLF signals, and of the mechanism of VLF emission generation --- electromagnetic radiation - magnetosphere
[AD-A006464] N75-29620
Research on biological effects of VLF band electromagnetic radiation
[AD-A006388] N75-29753
An investigation of electromagnetic wave scattering from rough surfaces, based on a comparison between vectorial and scalar Kirchhoff methods
[FOA-B-20002-E1] N75-29862

ELECTROMAGNETIC SCATTERING
Numerical techniques for electromagnetic scattering
[AD-A006459] N75-29312

ELECTROMAGNETIC WAVE TRANSMISSION
Ionospheric effects on transionospheric measurements of range and range difference
[AD-A006118] N75-29314

ELECTRON BOMBARDMENT
Experimental investigation of beams exhausted from a 5cm mercury electronbombardment ion engine
[NAL-TR-398] N75-29176

ELECTRON DISTRIBUTION
Electron angular distributions above the dayside auroral oval
[NASA-CR-143267] N75-29604

ELECTRON EMISSION
Radiation induced electron emission --- from solid materials
[AD-A006396] N75-29930

ELECTRON ENERGY
The electron energy loss rates by polar molecules
[ISAS-530-VOL-40-NO-10] N75-29871
Calculations of X-ray Breusstrahlung spectra and scintillator detector yields for relativistic electron energies from 10 keV to 10 MeV
[AD-A006552] N75-29902

ELECTRON IRRADIATION
Results of irradiation tests on various electronic components
[CNES-NT-11] N75-29325

ELECTRON MICROSCOPES
Fractography of fatigue crack propagation in 2024-T3 and 7075-T6 aluminium alloys tested in air and vacuum
[NLR-TR-74094-U] N75-29253
Direct observation of small cluster mobility and ripening --- during annealing of metal films on amorphous substrates
[NASA-TM-X-62456] N75-29915

ELECTRON PRECIPITATION
A study of energetic particle precipitation effects associated with discrete VLF signals, and of the mechanism of VLF emission generation --- electromagnetic radiation - magnetosphere
[AD-A006464] N75-29620

ELECTRON RADIATION
Dispersion relation for electron waves propagating in an isotropic plasma containing Maxwellian and suprathermal electrons
N75-29881

ELECTRONIC EQUIPMENT
FAA lightning protection study: Lightning protection requirements for Wilcox Mark I/C instrument landing system
[AD-A009010] N75-29136
Electromagnetic interference measurements in electronic voice switching equipment areas
[AD-A008925] N75-29288
Power interrupt equipment
[AD-A010009] N75-29319
Measured effects of square wave modulated RF fields [450 and 3100 MHz] on cardiac pacemakers
[AD-A006389] N75-29755
Evaluating maintenance performance test administrator's manual and text subject's instructions for criterion referenced job task performance tests for electronic maintenance
[AD-A005785] N75-29768

ELECTROPLATING
Developments in convective heat transfer models featuring seamless and selected detail surfaces, employing electroless plating
[NASA-CR-144364] N75-29356

ELECTROSTATIC ENGINES
Charge-exchange plasma generated by an ion thruster
[NASA-CR-134844] N75-29175

ELEVONS
Differential elevon effectiveness lateral control optimization and elevon hinge moment investigation on a 0.015 scale space shuttle orbiter model 49-0 [140A/B/C modified] in the AECD VKF wind tunnel A [0A115]
[NASA-CR-141534] N75-29165

ELLIPTIC DIFFERENTIAL EQUATIONS
Convergence of higher order pseudoparabolic partial differential equations
[AD-A005823] N75-29830

EMISSION SPECTRA
Firebird interferometer --- for observation of infrared plume emission
[AD-A005815] N75-29395
Photometric research for the K2, 3 chromospheric flocculi
N75-29982

ENCLOSURES
Solar 10 kW turboalternator silent power program
[AD-A006549] N75-29555

ENERGY
Characteristics of energy released in a channel formed by an exploding wire
[AD-A005959] N75-29344

ENERGY CONSERVATION
Fuel conservation in ship operations
[COM-75-10466/1] N75-29270
Energy conservation study of Veterans Administration hospitals. Stage 1: Base line survey
[PB-241095/9] N75-29559
Energy conservation study of Veterans Administration hospitals. Stage 2: Operational study
[PB-241096/7] N75-29560
Energy conservation study of Veterans Administration hospitals. Stage 3: Hospital energy control system
[PB-241097/5] N75-29561
Energy conservation study of Veterans Administration hospitals. Stage 4: Basic detail data for stage 1, 2, and 3
[PB-241098/3] N75-29562
Space life support technology for a modular integrated utility system
N75-29723

ENERGY CONSUMPTION
Alternative strategies for optimizing energy supply, distribution, and consumption systems on Naval bases. Volume 3: Assessment of total energy system applications at Naval facilities
[AD-A003590] N75-29550

ENERGY CONVERSION
Light conversion in dye lasers
[BLL-M-23559-[5828.4F]] N75-29405
Evaluation of pollution control in fossil fuel conversion processes: Gasification. Section 1: CO2 acceptor process
[PB-241141/1] N75-29596

ENERGY CONVERSION EFFICIENCY
An investigation of the influence of the wet surface area of a positive electrode on the energy conversion efficiency during the electrical explosion of conductors
[AD-A005971] N75-29343

ENERGY DISSIPATION
A mechanism for driving the gross Birkeland current configuration in the auroral oval --- energy dissipation - plasma sheaths/geomagnetic tail
[TRITA-EPP-74-25] N75-29607
The electron energy loss rates by polar molecules
[ISAS-530-VOL-40-NO-10] N75-29871

ENERGY LEVELS
Analysis of the ground term energy levels for triply ionized neodymium in yttrium orthovanadate
[AD-A006017] N75-29873
Nuclear structure research --- discussion of heavy ions, rare earth elements, and energy levels
N75-29875

ENERGY POLICY
Extracting minerals from geothermal brines: A literature study
[PB-240681/7] N75-29545
Solar energy power system
[NASA-CASE-MFS-21628-2] N75-29548
Alternative strategies for optimizing energy supply, distribution, and consumption systems on Naval bases. Volume 3: Assessment of total energy system applications at Naval facilities
[AD-A003590] N75-29550
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240784/9] N75-29552
Review of Project Independence Blueprint: Panel subcommittee reports on FEA-interagency task forces
[COM-75-10500/7] N75-29553
Oil and US policy
[AD-A006473] N75-29558
Energy conservation study of Veterans Administration hospitals. Stage 1: Base line survey
[PB-241095/9] N75-29559
Energy conservation study of Veterans Administration hospitals. Stage 2: Operational study
[PB-241096/7] N75-29560
Energy conservation study of Veterans Administration hospitals. Stage 3: Hospital energy control system
[PB-241097/5] N75-29561
Energy conservation study of Veterans Administration hospitals. Stage 4: Basic detail data for stage 1, 2, and 3
[PB-241098/3] N75-29562
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240553/8] N75-29570
Environmental regulations and energy for home heating
[PB-240699/9] N75-29587
Evaluation of pollution control in fossil fuel conversion processes: Gasification. Section 1: CO2 acceptor process
[PB-241141/1] N75-29596
Report to Congress on control of sulfur oxides
[PB-241021/5] N75-29597
The MCL-Thurow model supplement
[PB-241113/0] N75-29952
Economic impact of shortages on the fertilizer industry
[PB-240418/4] N75-29953

ENERGY SOURCES
The long term energy problem and aeronautics
N75-29012

ENERGY STORAGE
Nickel hydrogen energy storage satellites
[AD-A006427] N75-29567

ENERGY TRANSFER
Rate constants of some elementary stages of the reaction of fluorine with hydrogen
[AD-A006011] N75-29231

ENGINE DESIGN
Calculation of aircraft engine turbines. [Gasdynamic calculation: Blade profiling]
[NASA-TT-F-16367] N75-29120

ENGINE INLETS
Potential and viscous flow prediction in V/STOL propulsion system inlets
[NASA-TM-X-71776] N75-29110
Experimentally determined aeroacoustic performance and control of several sonic inlets
[NASA-TM-X-71767] N75-29353

ENGINE MONITORING INSTRUMENTS
Aircraft engine speed and fuel flow signal conditioner with digital output
[ARL/ME-NOTE-354] N75-29111

ENGINE NOISE
Estimation of subsonic far-field jet-mixing noise
[ESDU-74002] N75-29103

An introduction to gas turbine exhaust noise
[ESDU-74001] N75-29104
ENGINE TESTS
Full-scale aerodynamic and engine testing of the APL Symdel Mk 6 RPV
[AD-A006283] N75-29099
ENVIRONMENT EFFECTS
Skylab program payload integration. Skylab film environmental effects
[NASA-TM-X-64951] N75-29387
Safety evaluation of the Washington public power supply system, nuclear projects 1 and 4. Dockets 50-460 and 50-513
[PB-241266/6] N75-29882
Safety evaluation report of Joseph M. Farely nuclear plant, units 1 and 2
[PB-241108/0] N75-29883
Environmental survey of transportation of radioactive materials to and from nuclear power plants, supplement 1
[PB-241065/2] N75-29956
ENVIRONMENT MANAGEMENT
Design phase of an environmental technology utilization pilot project through the agricultural extension service in Tennessee
[PB-240761/7] N75-29588
ENVIRONMENT MODELS
Hierarchical models of very large problems, dilemmas, prospects, and an agenda for the future
N75-29847
ENVIRONMENT POLLUTION
Principles for evaluating chemicals in the environment
[PB-240916/7] N75-29595
ENVIRONMENT PROTECTION
Handbook for environmental impact analysis
[AD-A006241] N75-29581
ENVIRONMENTAL CONTROL
Current status in aerospace medicine --- conference on habitability of spacecraft environments and environmental control
[AGARD-CP-154] N75-29722
The plus Gz protective methods for use in advanced fighter-attack aircraft
N75-29727
Vibration as an artificially created human factor of the environment
[NASA-TT-F-16475] N75-29776
ENVIRONMENTAL QUALITY
Land use forms and the environment. An executive summary
[PB-241093/4] N75-29584
ENVIRONMENTAL SURVEYS
Ecological characteristics of the Boardman Site and environs, Morrow County, Oregon --- environmental impact of electrical power generating stations
[PB-241071/0] N75-29502
Construction of Philadelphia Electric Company's Fulton generating station, units 1 and 2. Dockets nos. 50-463 and 50-464 --- environmental impact statement
[PB-241165/0] N75-29551
Handbook for environmental impact analysis
[AD-A006241] N75-29581
ENVIRONMENTAL TESTS
Desert storage test program
[AD-A006103] N75-29454
ENZYME ACTIVITY
Synthesis of N-acetylneuraminic acid derivatives and studies of their interaction with vibrio cholerae neuraminidase
[FOA-B-40018-B6] N75-29182
EPOXY RESINS
Fiber reinforced solids possessing great fracture toughness: The role of interfacial strength
[NASA-CR-143287] N75-29474
EQUATIONS OF MOTION
A vector-dyadic development of the equations of motion for N-coupled flexible bodies and point masses --- spacecraft trajectories
[NASA-TN-D-8047] N75-29857
EQUATORS
An analysis of the surface layer meteorological parameters measurements on equator --- time series analysis
N75-29643
EQUILIBRIUM EQUATIONS
The spectral balance equation --- determination of stream functions for the geopotential field
[DM-14] N75-29687
EQUIPMENT SPECIFICATIONS
A study to determine the adequacy of the tools and equipment used by Air Force women in the craft skills
[AD-A006342] N75-29767
ERGODIC PROCESS
Mixtures of invariant non-ergodic probabilities
[RR-162/MBR/1] N75-29840
ERROR ANALYSIS
Misperception of exponential growth. Part 1: Numerical stimuli
[IZF-1974-29-PT-1] N75-29762
Misperception of exponential growth. Part 2: Graphical stimuli
[IZF-1974-30-PT-2] N75-29763
ESCAPE ROCKETS
Study of outer space by reaction devices --- classical mechanics - interplanetary flight - escape rockets/jet propulsion
[NASA-TT-F-15571] N75-29141
ESRO 4 SATELLITE
ESRO-4 mission and operational programme
[ESRO-TN-116-ESTEC] N75-29158
ESTERS
Normal melting points, boiling points and critical points of n-alkyl esters of monobasic n-alkanoic acids
[ESDU-71001] N75-29203
Thermal conductivity of liquid branched chain esters of monobasic alkanoic acids
[ESDU-71022] N75-29205
ESTIMATING
Misperception of exponential growth. Part 1: Numerical stimuli
[IZF-1974-29-PT-1] N75-29762
Misperception of exponential growth. Part 2: Graphical stimuli
[IZF-1974-30-PT-2] N75-29763
The Monte Carlo method of evaluating integrals
[AD-A005891] N75-29837
ESTUARIES
A bibliography of numerical models for tidal rivers, estuaries and coastal waters
[COM-75-10477/8] N75-29712
EUROPA
Interpretation of surface features of Europa obtained from occultations by Io --- astronomical observations - Jupiter [planet]
[NASA-CR-143273] N75-29958
EUROPE
Meteorological data. Volume 145, no. 2: The European climatology for 1974. Meteorological satellite data from the Berlin zone of reception part 2, 2nd quarter
N75-29630
The role of the tropical zone in processes occuring in the system ocean - atmosphere - continent --- heat flow from the tropics to the Eurasian continent
[BLL-M-23692-[5828.4F]] N75-29634
EUROPEAN SPACE PROGRAMS
Jupiter orbiter. Study of critical aspects of a joint ESA/NASA project --- based on Pioneer H for Jupiter atmosphere mapping
[MBB-UR-V-77-74] N75-29975
EUTECTIC ALLOYS
Structure and thermal cycling stability of a hafnium monocarbide reinforced directionally solidified cobalt-base eutectic alloy
[NASA-TM-X-71751] N75-29242
Directionally solidified pseudo-binary eutectics of Ni-Cr-[Hf, Zr]
[NASA-TM-X-71765] N75-29243
EVACUATING [TRANSPORTATION]
Litter enplaning-deplaning device
[AD-A006137] N75-29754
EXCAVATION
The behavior of an axially loaded drilled shaft under sustained loading
[PB-240328/5] N75-29495
EXHAUST FLOW SIMULATION
An improved source flow characteristic technique for the analysis of scramjet exhaust flow fields
[NASA-CR-132697] N75-29361
EXHAUST GASES
Assessing and controlling the effect of aircraft on the environment: Pollution
N75-29009
Manual for improved source flow characteristics program --- user manuals [computer programs] supersonic combustion ramjet engines - exhaust gases
[NASA-CR-132696] N75-29360
USAF aircraft pollution emission factors and landing and takeoff LTO cycles
[AD-A006239] N75-29582
Sulfate control technology assessment. Phase 1: Literature search and analysis
[PB-240995/1] N75-29589
Development and utility of reactivity scales from smog chamber data --- hydrocarbons
[PB-241248/4] N75-29598
EXHAUST NOZZLES
An improved numerical procedure for the parametric optimization of three dimensional scramjet nozzles --- supersonic combustion ramjet engines - computer programs
[NASA-CR-132695] N75-29359
EXPERIMENTAL DESIGN
Improved seagoing scale
[AD-A006321] N75-29713
EXPLODING WIRES
An investigation of the influence of the wet surface area of a positive electrode on the energy conversion efficiency during the electrical explosion of conductors
[AD-A005971] N75-29343
Characteristics of energy released in a channel formed by an exploding wire
[AD-A005959] N75-29344
EXPLOSIVE FORMING
Center for high energy forming
[AD-A006259] N75-29446
EXPLOSIVES
Transition from deflagration to detonation in condensed phases
[TT-74-50028] N75-29213
EXPONENTIAL FUNCTIONS
Misperception of exponential growth. Part 1: Numerical stimuli
[IZF-1974-29-PT-1] N75-29762
Misperception of exponential growth. Part 2: Graphical stimuli
[IZF-1974-30-PT-2] N75-29763
EXTERNAL STORES
Extension of the method for predicting six-degree-of-freedom store separation trajectories at speeds up to the critical speed to include a fuselage with noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment --- external stores - attack aircraft
[AD-A005822] N75-29071
EXTINCTION
Pulsar extinction --- astrophysics
[NASA-CR-143272] N75-29969
EXTRAPOLATION
The accuracy of far-field noise obtained by the mathematical extrapolation of near-field noise data
[NASA-TM-X-62434] N75-29067
EXTREMELY LOW FREQUENCIES
The effect of extremely low frequency radiation on human performance: A preliminary study
[AD-A005898] N75-29756
EYE MOVEMENTS
Head and neck mobility of pilots measured at the eye
[RAE-TR-74158] N75-29781

F

F-8 AIRCRAFT
Extraction from flight data of longitudinal aerodynamic coefficients in maneuvering flight for F-8C aircraft
[NASA-TN-D-8019] N75-29039
F-89 AIRCRAFT
F-89 hydraulic actuator combinatorial geometric representation
[AD-A006435] N75-29101
FAIL-SAFE SYSTEMS
Failsafe/safe-life interface criteria
[AD-A006131] N75-29462
FAILURE ANALYSIS
ESRO-4 mission and operational programme
[ESRO-TN-116-ESTEC] N75-29158
Mechanical failure prognosis through oil debris monitoring
[AD-A006190] N75-29459
FAILURE MODES
Predictive distributions in life tests under competing causes of failure
[RR-166/GAB/IRD/1] N75-29450
Failure modes of angle ply laminates
[AD-A005737] N75-29493
FAR FIELDS
The accuracy of far-field noise obtained by the mathematical extrapolation of near-field noise data
[NASA-TM-X-62434] N75-29067
Estimation of subsonic far-field jet-mixing noise
[ESDU-74002] N75-29103
FAR ULTRAVIOLET RADIATION
Operation of the synchrotron radiation center of the University of Wisconsin --- a discussion of storage rings and far ultraviolet radiation
[AD-A005784] N75-29885
FATIGUE [MATERIALS]
The effects of notches of high Kt on the fatigue behaviour of 7178-T6 aluminium alloy
[ARL/SM-354] N75-29244
Fatigue crack propagation data for titanium sheet alloys: IMI 318
[NLR-TR-74048-U] N75-29252
Fractography of fatigue crack propagation in 2024-T3 and 7075-T6 aluminium alloys tested in air and vacuum
[NLR-TR-74094-U] N75-29253
Fatigue data bank and data analysis investigation, phase I
[PB-240261/8] N75-29254
Finite element fracture mechanics analysis of two-dimensional and axisymmetric elastic and elastic-plastic cracked structures --- for submarine hulls
[AD-A005880] N75-29261
Fatigue crack propagation in thin sheets of L73 under constant strain amplitude
[ARC-CP-1314] N75-29485
Fatigue behavior of welded reinforcement in reinforced concrete beams
[PB-240367/3] N75-29500
FATIGUE LIFE
Analysis of dynamic capacity of low-contact-ratio spur gears using Lundberg-Palmgren theory
[NASA-TN-D-8029] N75-29434
Comparison of pitting fatigue life of ausforged and standard forged AISI M-50 and AISI 9310 spur gears
[NASA-TN-D-8030] N75-29435

Thoughts on miner's fatigue damage rule
[BLL-RAE-TRANS-5027-[1609]] N75-29448
The application of fracture mechanics to the prediction of the fatigue life of sharply notched components
[BLL-CE-TRAN-6544-[9022.09]] N75-29470
A short study of the effect of a penetrant oil on the fatigue life of a riveted joint
[ARC-CP-1305] N75-29483

FATIGUE TESTS
Crack growth in Ti-8Al-1Mo-1V with real-time and accelerated flight by flight loading
[NASA-TM-X-72754] N75-29092
Procedure for testing synthetic fiber cables for flexing fatigue under load
[AD-A006042] N75-29189
Fatigue damage equivalence of field and simulated vibrational environments
[AD-A006226] N75-29453
The effect of mean stress on the fatigue of aluminum alloys --- notched specimens
[S/T-MEMO-9/74] N75-29482
Flight-Simulation tests on notched elements --- fatigue and crack initiation
[NLR-TR-74033-U] N75-29488

FEEDBACK CONTROL
A simulation study of active feedback supression of dynamic response in helicopter rotor blades
[NASA-CR-132711] N75-29127
Satellite operations model extension --- COS-B closed loop model
[ESS/SS-617] N75-29146

FEMALES
A study to determine the adequacy of the tools and equipment used by Air Force women in the craft skills
[AD-A006342] N75-29767
Training of enlisted women as jet aircraft maintenance specialists
[AD-A006434] N75-29771

FERRITES
Broadband ferrite limiters --- microwave equipment
[AD-A005279] N75-29328

FERROMAGNETIC MATERIALS
Magnetic fluids: Magnetic forces and pumping mechanisms
[AD-A006323] N75-29867

FERROUS METALS
Background information for standards of performance: Electric submerged arc furnaces for production of ferroalloys. Volume 1: Proposed standards
[EPA-450/2-74-018A] N75-29573

FERTILIZERS
Development document for effluent limitations guidelines and new source performance standards for the formulated fertilizer segment of the fertilizer manufacturing point source category
[PB-240863/1] N75-29578
Economic impact of shortages on the fertilizer industry
[PB-240418/4] N75-29953

FILES
PANGLOSS: A system for reading and checking files
[NPL-NAC-59] N75-29794

FILM COOLING
Experimental verification of film-cooling concepts on a turbine vane
[NASA-TM-X-71777] N75-29107
Film cooling effectiveness from rows of holes under simulated gas turbine conditions
[ARC-CP-1303] N75-29367

FINITE DIFFERENCE THEORY
A finite-difference scheme for computing supercritical flows in arbitrary co-ordinate systems
[ARC-CP-1313] N75-29050

FINITE ELEMENT METHOD
Finite element fracture mechanics analysis of two-dimensional and axisymmetric elastic and elastic-plastic cracked structures --- for submarine hulls
[AD-A005880] N75-29261
Application of the finite element method to fluid problems --- potential and viscous flow
[BLL-RTS-9414] N75-29348
The Shock and Vibration Digest, Volume 7, No. 2, February 1975 --- finite element method
[AD-A006665/4] N75-29465
Optimum configuration of truss structures — using the finite element displacement method
[NAL-TR-388T] N75-29471
An incore finite element program for research and teaching purposes — matrix displacement method
[ISD-162] N75-29486
Finite element solutions for the equations of ground-water flow
[PB-240813/6] N75-29542
A direct method for the generation of shape functions of any desired continuity for rectangular finite elements
[TT-7501] N75-29822

FIRE CONTROL
An estimator for an anti-aircraft gun fire control system
[AD-A005763] N75-29858

FIRES
Analysis of fires caused by short circuits in cable networks in mines in the Ukrainian SSR
[AD-A006002] N75-29336

FISHES
Studies on the otoliths of the teleosts
[NASA-TT-F-16471] N75-29742

FLAME PROPAGATION
Propagation of the flame within a narrow tube
[NAL-TR-394] N75-29212
Theoretical aspects of the fundamental velocity of flames in the turbulent regime
[NASA-TT-F-16511] N75-29215
Numerical simulation of flame induced aerodynamics in a coal-mine passageway, semi-empirical model
[PB-240843/3] N75-29379

FLAME RETARDANTS
Flame resistant elastomeric polymer development --- for use in space shuttle instrument packaging
[NASA-CR-144362] N75-29264

FLAME STABILITY
Stabilization of the flame of heterogeneous mixtures
[AD-A006010] N75-29230

FLAMES
Chemical flame inhibition using molecular beam mass spectrometry. Computational methods for analyzing flame microstructure
[PB-241245/0] N75-29219

FLAMMABILITY
Research, development and application of noncombustible Beta fiber structures --- for Apollo
[NASA-CR-144365] N75-29186

FLANGES
Mode interaction with stiffened panels
[VTH-180] N75-29489

FLAT PLATES
Stiffnesses of laminated flat plates
[ESDU-75002] N75-29466
Stress analysis of laminated flat plates
[ESDU-74039] N75-29467
Flat panels in shear. Buckling of long panels with transverse stiffeners
[ESDU-02.03.02] N75-29469

FLAT SURFACES
A leading edge heating array and a flat surface heating array - operation, maintenance and repair manual
[NASA-CR-144357] N75-29088

FLEXIBILITY
Characteristics of and factors influencing bituminous materials and mixture
[PB-240957/1] N75-29191

FLEXIBLE BODIES
A vector-dyadic development of the equations of motion for N-coupled flexible bodies and point masses --- spacecraft trajectories
[NASA-TN-D-8047] N75-29857

FLIGHT CHARACTERISTICS
Vibrations measured in the passenger cabins of two jet transport aircraft
[NASA-TN-D-7923] N75-29037
Human comfort response to random motions with a dominant vertical motion
[NASA-TM-X-72691] N75-29774

FLIGHT CONTROL
Status and trends in active control technology N75-29015
Flight control and the effectiveness of an aviation system
[NASA-TT-F-16262] N75-29126

FLIGHT CREWS
Treadmill exercise testing at the USAF School of Aerospace Medicine: Physiological responses in aircrewmen and the detection of latent coronary artery disease
[AGARD-AG-210] N75-29736
Physiological parameters of exercise performance N75-29737
Some studies relating to limb flailing after an emergency escape from an aircraft
[AD-A005699] N75-29752

FLIGHT HAZARDS
Vortex-related accidents over the ten year period 1964 - 1973
[AD-A010111] N75-29065

FLIGHT PLANS
Flight control and the effectiveness of an aviation system
[NASA-TT-F-16262] N75-29126

FLIGHT SAFETY
Flight safety work of the German Aviation and Space Research Institute
[DLR-MITT-75-05] N75-29070

FLIGHT SIMULATION
Engineering simulation evaluation of the two-segment noise abatement approach in the Douglas DC-8-61
[NASA-CR-137665] N75-29121
A simulation study of active feedback supression of dynamic response in helicopter rotor blades
[NASA-CR-132711] N75-29127
Flight-Simulation tests on notched elements --- fatigue and crack initiation
[NLR-TR-74033-U] N75-29488

FLIGHT STABILITY TESTS
Free-flight model dynamic stability measurements on a not-so-slender wing/fin combination at zero and small lift, Mach number equals 0.8 to 2.0
[ARC-CP-1315] N75-29051

FLIGHT TESTS
Evaluation of a very low frequency navigation system
[AD-A005043] N75-29074
Baseline measurement of the noise generated by a short-to-medium range jet transport flying standard ILS approaches and level flyovers
[NASA-TM-X-72760] N75-29119

FLIGHT TIME
A direct time history study of the response of an airplane to nonstationary turbulence
[AD-A006159] N75-29102

FLIGHT TRAINING
The measurement of operator capacity by manipulation of dual task demands
[AD-A006352] N75-29765
Man as a precious resource: The enhancement of human effectiveness in flight operations
[AD-A006353] N75-29766

FLOOD DAMAGE
Redesigning flood management: Project Agnes, phase 1
[PB-241064/5] N75-29544

FLOOD PREDICTIONS
Redesigning flood management: Project Agnes, phase 1
[PB-241064/5] N75-29544

FLOODS
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
The use of LANDSAT DCS and imagery in reservoir management and operation --- Saint John River, Maine and Canada
[E75-10378] N75-29520

FLORIDA
Remote sensing over North Merritt Island --- space shuttle runway
[E75-10371] N75-29513

FLOW CHARACTERISTICS
On wake vortex alleviation N75-29010

FLOW DISTRIBUTION
Numerical computation of three-dimensional blunt body flow fields with an impinging shock
[NASA-CR-143312] N75-29038
Investigation of the flows flowing from swirlers, I
[NAL-TR-376] N75-29105
Technical evaluation report on fluid dynamics panel symposium on Airframe/Propulsion --- a discussion of air intakes, nozzle flow, and flow distribution
[AGARD-AR-81] N75-29114
Flow mechanisms and noise in control valves with model tests in the near sonic and supersonic range
[BLL-CE-TRANS-6607-[9022.09]] N75-29347
Three-dimensional flow field due to a radial vortex and source line spanning an annulus
[NAL-TR-378T] N75-29354
An improved source flow characteristic technique for the analysis of scramjet exhaust flow fields
[NASA-CR-132697] N75-29361
Measurements at the leeward side of a cone at large incidences in supersonic flow
[VTH-186] N75-29370
Calculation of non-lifting potential flow about arbitrary three dimensional bodies based on doublet distributions
[AD-A005877] N75-29377

FLOW EQUATIONS
A form of the supersonic flow equations for an ideal gas
[ARC-R/M-3757] N75-29042

FLOWMETERS
Single-wing current meter housing --- reliability engineering
[AD-A006281] N75-29398

FLUID AMPLIFIERS
Fluidic hydraulic element with high input resistance
[AD-A006078] N75-29372

FLUID JETS
Operating limitations of high speed jet lubricated ball bearings
[NASA-TM-X-71678] N75-29429

FLUID MECHANICS
Application of the finite element method to fluid problems --- potential and viscous flow
[BLL-RTS-9414] N75-29348
A hot-wire surface gage for skin friction and separation detection measurements
[NASA-TM-X-62465] N75-29384

FLUID TRANSMISSION LINES
Transfer matrices of hydraulic systems. Theoretical and experimental study --- propellant transfer noting pogo effect N75-29990

FLUIDICS
Analysis of flow in a bistable fluidic element to improve its characteristics --- with downstream flow measured by optical anemometer
[AD-A006087] N75-29371

FLUORIDES
Investigation of DF laser propagation
[AD-A005631] N75-29608

FLUORINE
Rate constants of some elementary stages of the reaction of fluorine with hydrogen
[AD-A006011] N75-29231

FLUTTER ANALYSIS
The effect of compressibility on unstalled torsional flutter
[ARC-R/M-3754] N75-29040
A technique for analysing the results of a flutter calculation --- exemplified for tail assembly with two degrees of freedom
[ARC-R/M-3765] N75-29054

FLUX DENSITY
Characteristics of energy released in a channel formed by an exploding wire
[AD-A005959] N75-29344
Generation of standard EM fields for calibration of power density meters 20 kHz to 1000 MHz
[COM-75-10395/2] N75-29404

FLY BY WIRE CONTROL
Status and trends in active control technology
N75-29015
Digital flight control system redundancy study --- fly by wire control - aircraft guidance
[AD-A006411] N75-29129

FLYING PERSONNEL
Statistics in human engineering --- military flying personnel
[RAE-TR-74166] N75-29782

FOG
Microphysical characteristics of local fogs
[AD-A006075] N75-29697

FOOD
A cosmic model of the biosphere
[NASA-TT-F-16460] N75-29968

FORESTS
A study to analyze six band multispectral images and fabricate a Fourier transform detector --- optical data processing - aerial photography/forests
[NASA-CR-120684] N75-29388
Aerial spray evaluation pine butterfly test, Bitterroot National Forest, Montana, 1973
[AD-A006256] N75-29401
Ohio Skylab EREP investigation
[E75-10365] N75-29507
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
Ohio Skylab EREP investigation
[E75-10373] N75-29515
Recognition map analysis and crop acreage estimation
[E75-10380] N75-29522
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs --- Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain
[E75-10382] N75-29524
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525

FORGING
Comparison of pitting fatigue life of ausforged and standard forged AISI M-50 and AISI 9310 spur gears
[NASA-TN-D-8030] N75-29435
Forged metal powder gears --- for automobiles
[AD-A005787] N75-29441

FORTRAN
A FORTRAN 4 program for the determination of the anomalous potential using stepwise least squares collocation
[AD-A006362] N75-29618

FOSSIL FUELS
Evaluation of pollution control in fossil fuel conversion processes: Gasification. Section 1: CO2 acceptor process
[PB-241141/1] N75-29596

FOUNDATIONS
The behavior of an axially loaded drilled shaft under sustained loading
[PB-240328/5] N75-29495

FOURIER TRANSFORMATION
Digital Doppler processing using Walsh and quantized Fourier transforms
[AD-A006116] N75-29313
A study to analyze six band multispectral images and fabricate a Fourier transform detector --- optical data processing - aerial photography/forests
[NASA-CR-120684] N75-29388
Comparison of orthogonal transforms for teleseismic data
[AD-A006232] N75-29609
Stepwise Iterative Fourier Transform: The SIFT
[NASA-CR-144377] N75-29820

FRACTOGRAPHY
Fractography of fatigue crack propagation in 2024-T3 and 7075-T6 aluminium alloys tested in air and vacuum
[NLR-TR-74094-U] N75-29253

FRACTURE MECHANICS
Finite element fracture mechanics analysis of two-dimensional and axisymmetric elastic and elastic-plastic cracked structures --- for submarine hulls
[AD-A005880] N75-29261
Thoughts on miner's fatigue damage rule
[BLL-RAE-TRANS-5027-[1609]]
N75-29448
Fracture control method for composite tanks with load sharing liners
[NASA-CR-134758] N75-29449
The application of fracture mechanics to the prediction of the fatigue life of sharply notched components
[BLL-CE-TRAN-6544-[9022.09]]
N75-29470
Fracture testing with surface crack specimens --- especially the residual tensile strength test
[NASA-TM-X-71772] N75-29473
Experimental study on preceding viscoelastic strain disturbances: An inverse problem in dynamic fracture
[ISAS-529-VOL.-40-NO-9] N75-29477
Rio Blanco massive hydraulic fracturing demonstration
[PB-240849/0] N75-29614
Study of grain boundary segregation relating to intergranular fracture
[AD-A006422] N75-29934

FRACTURE STRENGTH
The feasibility of ranking material fracture toughness by ultrasonic attenuation measurements
[NASA-TM-X-71769] N75-29241
The effects of notches of high Kt on the fatigue behaviour of 7178-T6 aluminium alloy
[ARL/SM-354] N75-29244
Fatigue strength of the titanium alloys Ti 8Al 1Mo 1V, Ti 5Al 2.5Sn and Ti 6Al 4V at high temperatures --- 246 C and 340 C
[ISD-161] N75-29251
Fiber reinforced solids possessing great fracture toughness: The role of interfacial strength
[NASA-CR-143287] N75-29474
The thickness effect in plane stress fracture toughness
[NLR-TR-74032-U] N75-29487

FREDHOLM EQUATIONS
Spline approximation to the solution of the linear Fredholm integral equation of the second kind
[AD-A006539] N75-29827
Rational approximations to the solution of Fredholm integral equations
[AD-A006458] N75-29834

FREE FLIGHT
Free-flight model dynamic stability measurements on a not-so-slender wing/fin combination at zero and small lift, Mach number equals 0.8 to 2.0
[ARC-CP-1315] N75-29051

FREE RADICALS
Free radical OH, a molecule of astrophysical and aeronomic interest --- radio sources [astronomy] - spectroscopic analysis
[NASA-SP-373] N75-29960

FREEZE DRYING
Dinner for a cosmonaut --- development of freeze dried foods
[NASA-TT-F-16465] N75-29772

FREQUENCY DIVISION MULTIPLEXING
A radio telephone system with code division multiplexing
[BLL-PO-3206-[9022.81]] N75-29283

FREQUENCY MODULATION
A heterodyne detection FM-CW laser radar using a 10 micrometers source
[AD-A005865] N75-29419

FRETTING
Fretting of titanium at temperatures to 650 C in air
[NASA-TN-D-8048] N75-29250

FRICTION FACTOR
Porous friction surface course --- for airport pavements
[AD-A009012] N75-29134

FUEL COMBUSTION
Combustion of rich kerosene-air mixtures in tunnel type chamber
[AD-A005995] N75-29222
Influence of combustion phenomena on the pogo effect --- time delay parameter in combustion chamber transfer function
N75-29989

FUEL CONSUMPTION
The long term energy problem and aeronautics
N75-29012
Energy intensity of barge and rail freight hauling
[PB-240012/5] N75-29269
Fuel conservation in ship operations
[COM-75-10466/1] N75-29270
Environmental regulations and energy for home heating
[PB-240699/9] N75-29587

FUEL CONTROL
Digital fuel controller for lift jet engine
[NAL-TR-389] N75-29122

FUEL GAGES
Aircraft engine speed and fuel flow signal conditioner with digital output
[ARL/ME-NOTE-354] N75-29111

FUEL PUMPS
Miniaturized high speed controls for turbine engines fabrication and test
[AD-A006108] N75-29125

FUEL VALVES
Combination automatic-starting electrical plasma torch and gas shutoff valve --- for satellite attitude control
[NASA-CASE-XLE-10717] N75-29426

FUEL-AIR RATIO
Combustion of rich kerosene-air mixtures in tunnel type chamber
[AD-A005995] N75-29222

FUNCTIONS [MATHEMATICS]
The use of Bernstein polynomials in approximating a function and its derivative
[BLL-M-23707-[5828.4F]] N75-29428
A direct method for the generation of shape functions of any desired continuity for rectangular finite elements
[TT-7501] N75-29822

G

GALERKIN METHOD
An H sup [-1] Galerkin method for parabolic problems in a single space variable
[AD-A006541] N75-29826

GALLIUM
Modulation spectroscopy of layer semiconductors GaSe and GaTe
[ISS-L-74/2] N75-29911

GALLIUM ARSENIDES
Vapor deposition apparatus --- semiconductors and gallium arsenides
[NASA-CASE-HQN-10462] N75-29192

GAMMA RAY BEAMS
Spectroscopy in the sd and fp shells --- gamma ray spectroscopy
N75-29878
Spectroscopy in the rare earth region
N75-29880

GAMMA RAYS
Problems of the gamma ray laser
[AD-A006197] N75-29424

GARP ATLANTIC TROPICAL EXPERIMENT
Preliminary scientific results of the GARP Atlantic tropical experiment, volume 2
[GATE-14-VOL-2] N75-29639
The low-level structure of an African disturbance determined by aircraft reconnaissance --- compared with satellite IR photography
N75-29640
Study of the A- and B-scale disturbances propagating across the African continent
N75-29641
Atmospheric disturbances over the Atlantic GATE area as seen from satellite data --- cyclones
N75-29642
An analysis of the surface layer meteorological parameters measurements on equator --- time series analysis
N75-29643
Diurnal and semidiurnal variations by meteorological measurements on equator
N75-29644
On characteristic time scales of meteorological fields in the tropical Atlantic zone
N75-29645
On modulation interaction of the various scale waves in the Atlantic tropical zone
N75-29646
On the latitudinal variation of the characteristics of the inversion layers in the region of ITCZ in the east Atlantic
N75-29647
Cloud cover dynamics over the tropical Atlantic during the GATE first observing period
N75-29648
Cloud cluster formation over monsoon Africa
N75-29649
On the orders of the values of the meteorological elements obtained in the A/B array in the period of GATE
N75-29650
On a principle of validation of the meteorological observation results in GATE-74
N75-29651
The quality of upper air observations in the GATE B-area --- using Omega and VLF navigation systems and balloon sounding
N75-29652
Observations on convective clouds over the tropical Atlantic
N75-29653
On microstructure of clouds in the eastern zone of the Atlantic
N75-29654

On the structure and organization of clouds in the GATE area
N75-29655
On the structure of the cumulus clouds at the equator in connection with meteorological conditions according to the stereophotographic measurements on board the R/V Akademik Kurchatov
N75-29656
Investigation of the structure of precipitation areas -- using radar echoes
N75-29657
Radar investigations of evolution of clouds in the eastern Atlantic
N75-29658
Preliminary analysis of a selective sample of GATE ship and aircraft data --- upper atmosphere temperature and humidity
N75-29659
On the effects of thermodynamic conditions on the evolution of convective clouds in the tropical zone of east Atlantic
N75-29660
Rapid structural changes in an asymmetrical tropical depression
N75-29661
On the wind, temperature, and humidity fields in the vicinity of an east-west line of showers
N75-29662
Case study of the physical structure of individual cumulo nimbus [mission 226-4, type 8B2]
N75-29663
Preliminary results of acoustic echo sounding of the marine boundary layer during GATE
N75-29665
The cool skin of the ocean --- temperature differences between ocean surface and few cm below
N75-29666
Turbulent characteristic measurements in the marine boundary layer during GATE
N75-29667
Bulk aerodynamic description of turbulent fluxes at the surface with and without precipitation --- air water interactions
N75-29668
Preliminary report on determination of fluxes by direct and profile method during intercomparison 2A -- - heat flux, water vapor, and transport properties
N75-29669
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 1: Reflection indicatrix
N75-29670
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 2: The spectral albedo
N75-29671
Aerosol and water vapour influences on direct solar radiation fluxes in the centre of equatorial Atlantic
N75-29672
On the relation between optical and aerosol characteristics of the east Atlantic atmosphere
N75-29673
Infrared radiation budget of the Harmattan haze --- West Africa
N75-29674
Fluctuations in the vertical structure of the Atlantic equatorial undercurrent
N75-29675
On the reality of existence of sporadic large-scale eddy formations in the ocean
N75-29676
Ocean currents observed by NOAA ship Oceanographer during GATE
N75-29677
Main statistical characteristics of currents in the northern part of B-scale
N75-29678
On representativity of wave measurements made by Soviet ships during Tropical Experiment-74
N75-29679
Anomalous variations in temperature-salinity relationships at GATE station 7
N75-29680
Variations of temperature, salinity and currents in the mixed layer and the thermocline [preliminary results]
N75-29681
On some questions of interaction between the Ocean and atmosphere in the northern part of A/B scale
N75-29682
The experiment of investigation of the dynamics of the upper ocean layer at the Equator
N75-29683
Preliminary analysis of ocean internal wave observations by acoustic soundings
N75-29684

GAS CHROMATOGRAPHY
The gas density balance and the mass chromatograph
[AD-A006481] N75-29226

GAS DENSITY
The gas density balance and the mass chromatograph
[AD-A006481] N75-29226

GAS DETECTORS
Carbon monoxide monitor --- using real time operation
[NASA-CASE-MFS-22060-1] N75-29380
The effect of gases on the conductive properties of organic semiconductors. Part 5: Results for films of chloranil, phenanthrene, phenazine, phtalocyanine [metal free] and crystal violet
[CL-1974-13-PT-5] N75-29917

GAS DISCHARGES
Spherically symmetric optical discharge as analog of diffusion combustion in the mixture of fuel gases
[AD-A005991] N75-29225

GAS DYNAMICS
Preliminary analysis of a light-gas gun-driven gas dynamic laser
[DREV-4011/75] N75-29406
Solution of problems in physical and chemical kinetics by the Monte Carlo method
[AD-A006083] N75-29874
Conservation forms of gas dynamic equations
N75-29993

GAS FLOW
Numerical calculation of two classes of potential problems, illustrated with the flow from a channel against a wedge
[WTHD-71] N75-29366

GAS JETS
On turbulent diffusion in coaxial jets of dissimilar gases with pressure gradient
[NAL-TR-392T] N75-29350

GAS LASERS
Formal kinetics of reactions occurring in photodissociation gas lasers
[AD-A005954] N75-29220
A numerical study on the effects of viscosity on the performance of CO2 gasdynamic laser --- using laminar boundary layer model and turbulent wake model
[ISAS-528-VOL-40-NO-8] N75-29408
Waveguide gas laser
[AD-A006410] N75-29416
Fine orifice injector development
[AD-A006204] N75-29418
Investigation of high power MHD gas lasers
[AD-A006298] N75-29420
Optical-band antennas
[AD-A005966] N75-29421

GAS MIXTURES
Computer analysis of the mass spectra of gas mixtures
[AD-A006160] N75-29221
Spherically symmetric optical discharge as analog of diffusion combustion in the mixture of fuel gases
[AD-A005991] N75-29225
Stabilization of the flame of heterogeneous mixtures
[AD-A006010] N75-29230
Experiments of nonequilibrium, nonstationary expansion of water vapour/carrier gas mixture in a shock tube
[UTIAS-195] N75-29863

GAS TURBINE ENGINES
Erosion in radial inflow turbines. Volume 5: Computer programs for tracing particle trajectories
[NASA-CR-134787] N75-29109
High temperature sensors for Army gas turbine engines
[AD-A005166] N75-29123
Miniaturized high speed controls for turbine engines fabrication and test
[AD-A006108] N75-29125
Film cooling effectiveness from rows of holes under simulated gas turbine conditions
[ARC-CP-1303] N75-29367
The use of Bernstein polynomials in approximating a function and its derivative
[BLL-M-23707-[5828.4F]] N75-29428
Examination of combustion stability in a swirling flow combustion chamber --- small gas turbine engine
N75-29991

GAS TURBINES
Estimation of subsonic far-field jet-mixing noise
[ESDU-74002] N75-29103
An introduction to gas turbine exhaust noise
[ESDU-74001] N75-29104
Experimental verification of film-cooling concepts on a turbine vane
[NASA-TM-X-71777] N75-29107
Calculation of aircraft engine turbines. [Gasdynamic calculation: Blade profiling]
[NASA-TT-F-16367] N75-29120

GAS-GAS INTERACTIONS
Experiments of nonequilibrium, nonstationary expansion of water vapour/carrier gas mixture in a shock tube
[UTIAS-195] N75-29863

GASOLINE
Performance of Army engines with leaded and unleaded gasoline. Phase 2: Field study evaluation
[AD-A005577] N75-29440

GEAR TEETH
Comparison of pitting fatigue life of ausforged and standard forged AISI M-50 and AISI 9310 spur gears
[NASA-TN-D-8030] N75-29435

GEARS
Major Item Special Study (MISS), UH-1H 90 degrees T/R gear box --- value engineering - UH-1 helicopter
[AD-A006506] N75-29098
Analysis of dynamic capacity of low-contact-ratio spur gears using Lundberg-Palmgren theory
[NASA-TN-D-8029] N75-29434
Forged metal powder gears --- for automobiles
[AD-A005787] N75-29441

GENERAL AVIATION AIRCRAFT
The next forty years in aviation
N75-29007
General aviation's future need for research
N75-29021
Study to develop regional and nation-wide estimates of General Aviation [GA] activity at non-towered airports
[AD-A009883] N75-29062

GENERATION
Wind tunnel generation of sinusoidal lateral and longitudinal gusts by circulation of twin parallel airfoils
[NASA-CR-137547] N75-29351

GEODESY
Station coordinates in the standard earth 3 system and radiation-pressure perturbations from ISAGEX camera data
[NASA-CR-143315] N75-29535
Some simple methods for the unique assignment of a density distribution to a harmonic function
[AD-A006026] N75-29615
Mean gravity anomaly prediction from terrestrial gravity data and satellite altimeter data
[AD-A006363] N75-29619
Catalogue of geoidal variations for simple seafloor topographic features
[NASA-CR-141400] N75-29706
Adjustment of mean earth ellipsoid parameters --- geodesy - mathematical models
[AD-A006364] N75-29972

GEODETIC COORDINATES
Station coordinates in the standard earth 3 system and radiation-pressure perturbations from ISAGEX camera data
[NASA-CR-143315] N75-29535

GEODETIC SATELLITES
AFCRL contributions to the National Geodetic Satellite Program [NGSP]
[AD-A006110] N75-29159

GEODETIC SURVEYS
AFCRL contributions to the National Geodetic Satellite Program [NGSP]
[AD-A006110] N75-29159

GEOLOGICAL FAULTS
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521

GEOMAGNETIC TAIL
A mechanism for driving the gross Birkeland current configuration in the auroral oval --- energy dissipation - plasma sheaths/geomagnetic tail
[TRITA-EPP-74-25] N75-29607

GEOMAGNETISM
Plasma on earth and in space
[NASA-TT-F-16373] N75-29895
Tables of non-vertical cutoff rigidities for 76 various locations --- geomagnetism, North America - Central America
[AD-A006397] N75-29973

GEOPHYSICS
Geophysics and Space data Bulletin. Volume 11, no. 3, third quarter 1974
[AD-A006402] N75-29501

GEOPOTENTIAL
A FORTRAN 4 program for the determination of the anomalous potential using stepwise least squares collocation
[AD-A006362] N75-29618

GEOPOTENTIAL HEIGHT
The spectral balance equation --- determination of stream functions for the geopotential field
[DM-14] N75-29687

GEOTHERMAL RESOURCES
Extracting minerals from geothermal brines: A literature study
[PB-240681/7] N75-29545

GERMANIUM COMPOUNDS
Amorphous semiconductors
[AD-A005831] N75-29931

GERMANY
Flight safety work of the German Aviation and Space Research Institute
[DLR-MITT-75-05] N75-29070
West German self-propelled cranes with hydraulic booms
[AD-A005948] N75-29439

GLASS
Studies related to the surfaces of the moon and planets --- a discussion of vapor deposition and glasses of lunar composition
[NASA-CR-143268] N75-29937

GLASS FIBERS
Research, development and application of noncombustible Beta fiber structures --- for Apollo
[NASA-CR-144365] N75-29186

Water and vinyl trichlorosilane vapor interactions with E-glass fibers
[AD-A005088] N75-29218
Experimental test of the load bearing capacity of smooth glass fibre reinforced plastic hollow cylinders subjected to external hydrostatic pressure
[BLL-NEL-TT-2564-[6075.461]] N75-29463

GOGGLES
Evaluation of proposed electroplated HGU-4-/P frames --- to determine the incidence of resulting nickel dermatitis
[AD-A006121] N75-29749

GOLD
An ellipsometric investigation of the underpotential deposition of lead on gold
[AD-A005915] N75-29257

GONDOLAS
Thermal control of tethered balloon gondolas
[CNES-NT-10] N75-29096

GOVERNMENT PROCUREMENT
Aeronautics in the American Society N75-29002
Evaluation of proposed criteria to be used in the selection of candidated for reliability improvement warranties --- cost analysis - government procurement/armed forces [United States]
[AD-A006335] N75-29460
An investigation of a proposed auction technique as a method of procurement
[AD-A006350] N75-29939
Economic analysis and new starts of federal government commercial or industrial activities
[AD-A006359] N75-29950

GOVERNMENT/INDUSTRY RELATIONS
Economic analysis and new starts of federal government commercial or industrial activities
[AD-A006359] N75-29950

GRAIN BOUNDARIES
Study of grain boundary segregation relating to intergranular fracture
[AD-A006422] N75-29934

GRANULAR MATERIALS
Inter-particle percolation. Part 1: Demonstration of the phenomenon and equipment development --- granular materials, shear strain
[OUEL-1102/74-PT-1] N75-29864
Inter-particle percolation. Part 2: Results and discussion --- granular materials, shear strain
[OUEL-1103/74-PT-2] N75-29865

GRAPHITE
High speed reacting and radiating flows --- radiative heat transfer - graphite/surface reactions/oxidation - reentry physics
[AD-A006460] N75-29374

GRAPHS [CHARTS]
Ship drift components: Means and standard deviations
[AD-A006470] N75-29708
Misperception of exponential growth. Part 2: Graphical stimuli
[IZF-1974-30-PT-2] N75-29763

GRASSLANDS
Recognition map analysis and crop acreage estimation using Skylab EREP data --- Michigan
[E75-10369] N75-29511
Recognition map analysis and crop acreage estimation
[E75-10375] N75-29517
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Recognition map analysis and crop acreage estimation
[E75-10380] N75-29522

GRAVITATIONAL EFFECTS
Effect of gravity on methane-air combustion --- computer programs
[NASA-CR-143350] N75-29211
Limitation on the use of the horizontal clinostat as a gravity compensator
[NASA-CR-143288] N75-29386
The plus Gz protective methods for use in advanced fighter-attack aircraft N75-29727

GRAVITATIONAL FIELDS
Analysis of the capability and limitations of relativistic gravity measurements using radio astronomy methods
[NASA-CR-120687] N75-29962

GRAVITY ANOMALIES
A FORTRAN 4 program for the determination of the anomalous potential using stepwise least squares collocation
[AD-A006362] N75-29618
Mean gravity anomaly prediction from terrestrial gravity data and satellite altimeter data
[AD-A006363] N75-29619
Catalogue of geoidal variations for simple seafloor topographic features
[NASA-CR-141400] N75-29706

GREAT BRITAIN
Detection of crop mark contrast for archaeological surveys --- Great Britain
[E75-10364] N75-29506

GREAT LAKES [NORTH AMERICA]
Summary of synoptic meteorological observations for Great Lakes areas. Volume 2: Lake Huron and Georgian Bay
[COM-75-10364/8] N75-29694
Summary of synoptic meteorological observations for Great Lakes areas. Volume 3: Lake Michigan
[COM-75-10365/5] N75-29695
Summary of synoptic meteorological observations for Great Lakes areas. Volume 4: Lake Superior
[COM-75-10366/3] N75-29696
Spatial and temporal variations of the turbulent fluxes of heat, momentum, and water vapor over Lake Ontario during IFYCL
[COM-75-10481/0] N75-29700

GROUND SUPPORT EQUIPMENT
AFBITS experimental equipment evaluations
[AD-A006192] N75-29309

GROUND SUPPORT SYSTEMS
Study of meteorological data processing methods
[ESRO-SP-85] N75-29689

GROUND TESTS
Tracked levitated research vehicle periodic test summary report: Primary suspension; aeropropelled
[PB-240994/4] N75-29957

GROUND TRUTH
Use of LANDSAT imagery for wildlife habitat mapping in northeast and east central Alaska
[E75-10367] N75-29509
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Ground truth data for test sites [SL-3] --- solar radiation and thermal radiation brightness temperature measurements
[NASA-CR-141911] N75-29531
Ground truth data for test sites [SL-4] --- thermal radiation brightness temperature and solar radiation measurments
[NASA-CR-141912] N75-29532

GROUND WATER
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
Finite element solutions for the equations of ground-water flow
[PB-240813/6] N75-29542

GROUND WAVE PROPAGATION
The estimation of the service areas of medium and long-wave broadcasting stations
[BBC-RD-1975/1] N75-29281

GROUND WIND
Objective methods of forecasting local surface winds
[BLL-M-23690-[5828.4F]] N75-29632

GROUND-AIR-GROUND COMMUNICATIONS
DABS link performance considerations
[AD-A009429] N75-29078

GULF OF MEXICO
Systematic variations in inshore bathymetry
[AD-A006393] N75-29709

GUN LAUNCHERS
An application of holographic interferometry to gun barrel erosion
[AD-A005867] N75-29400

GUNS [ORDNANCE]
An estimator for an anti-aircraft gun fire control system
[AD-A005763] N75-29858

GUST ALLEVIATORS
Status and trends in active control technology N75-29015

GUST LOADS
Measurement and analysis of unsteady aerodynamic force for the vertical gust on an airplane model in the NAL gust wind tunnel --- swept wing interference tests
[NAL-TR-399] N75-29027
Response of thin-walled cylinders to aerodynamic excitation, part I
[TT-7413-PT-1] N75-29480

GUSTS
Wind tunnel generation of sinusoidal lateral and longitudinal gusts by circulation of twin parallel airfoils
[NASA-CR-137547] N75-29351

GYROSCOPES
Ball bearings for inertial type gyroscopes: Low speed operation study
[LRBA-E-602-NT-26/SIE] N75-29437

H

HABITABILITY
Current status in aerospace medicine --- conference on habitability of spacecraft environments and environmental control
[AGARD-CP-154] N75-29722
Habitability design in Europe's spacelab: A status report N75-29724

HABITATS
Utilization of Skylab [EREP] system for appraising changes in continental migratory bird habitat
[E75-10361] N75-29503
Use of LANDSAT imagery for wildlife habitat mapping in northeast and east central Alaska
[E75-10367] N75-29509
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29523

HADRONS
Weak non leptonic decays of charmed hadrons
[ISS-P-75/4] N75-29912

HAFNIUM ALLOYS
Directionally solidified pseudo-binary eutectics of Ni-Cr-[Hf, Zr]
[NASA-TM-X-71765] N75-29243

HAFNIUM CARBIDES
Structure and thermal cycling stability of a hafnium monocarbide reinforced directionally solidified cobalt-base eutectic alloy
[NASA-TM-X-71751] N75-29242

HALOGENATION
Thermal conductivity of liquid halogenated aromatic hydrocarbons
[ESDU-74014] N75-29198

HALOGENS
High energy halogen chemistry
[AD-A006468] N75-29227

HANDBOOKS
Study plan to identify long term national telecommunications need and priorities applying Delphi techniques [handbook] --- technological forecasting - United States of America
[NASA-CR-143833] N75-29299
Handbook for environmental impact analysis
[AD-A006241] N75-29581

HARDENING [MATERIALS]
Method of heat treating age-hardenable alloys
[NASA-CASE-XNP-01311] N75-29236

HARDWARE
Simulation verification techniques study
[NASA-CR-144356] N75-29132

HARMONIC FUNCTIONS
Some simple methods for the unique assignment of a density distribution to a harmonic function
[AD-A006026] N75-29615

HAY
World climate and world food systems 1: Heyuppskera, an heuristic model for hay yield in Iceland
[PB-240870/6] N75-29690

HAZARDS
Natural hazards evaluation of existing buildings
[COM-75-10473/7] N75-29492

HAZE
Investigation of relationships between linears, tonal and hazy anomalies, and petroleum production in the Williston Basin: An ERTS approach
[E75-10370] N75-29512
Investigation of relationships between linears, tonal and hazy areas, and petroleum production in the Williston Basin: An ERTS approach
[E75-10384] N75-29526
Multiple scattered radiation emerging from continental haze layers. 1: Radiance, polarization, and neutral points
[NASA-CR-143269] N75-29605
Infrared radiation budget of the Harmattan haze --- West Africa N75-29674

HEAD [ANATOMY]
The prophylactic effect of headcooling on coal miner's cramps. 1: Electroencephalographic observation on rabbits during head-cooling under the hot and humid environment
[NASA-TT-F-16448] N75-29739

HEAD MOVEMENT
Head and neck mobility of pilots measured at the eye
[RAE-TR-74158] N75-29781

HEARING
The effect of quiet on hearing --- psychoacoustics - noise [sound]
[AD-A006395] N75-29748

HEART DISEASES
The aircrewman at increased risk of ischemic vascular disease N75-29728
Treadmill exercise testing at the USAF School of Aerospace Medicine: Physiological responses in aircrewmen and the detection of latent coronary artery disease
[AGARD-AG-210] N75-29736
Physiological parameters of exercise performance N75-29737
Electrocardiographic aspects of exercise testing N75-29738
Measured effects of square wave modulated RF fields [450 and 3100 MHz] on cardiac pacemakers
[AD-A006389] N75-29755

HEAT BALANCE
On some questions of interaction between the Ocean and atmosphere in the northern part of A/B scale
N75-29682

HEAT FLUX
Preliminary report on determination of fluxes by direct and profile method during intercomparison 2A --- heat flux, water vapor, and transport properties
N75-29669

HEAT RADIATORS
Optimization of plane fin-tube radiator for spacecraft energy supply
[NASA-TT-F-16473] N75-29171

HEAT RESISTANT ALLOYS
Effect of magnesium oxide content on oxidation behavior of some superalloy-base cermets
[NASA-TM-X-3265] N75-29187
Hot corrosion evaluation of aluminide coated superalloys in support of an ASTM Round Robin program
[NASA-TM-X-71734] N75-29240

HEAT STORAGE
Thermal energy storage systems
[NASA-CASE-MFS-23167-1] N75-29547

HEAT TRANSFER
The characteristics of self sustained particulate boron combustion in air at ambient pressure
[AD-A006039] N75-29233
A new concept of modeling the process of heat transfer on surfaces with artificial roughnesses and microfins
[NASA-TT-F-16506] N75-29357
A thin film catalytic-non-catalytic heat transfer gauge for shock tube measurements in reacting gases
[AASU-336] N75-29390

HEAT TREATMENT
Method of heat treating age-hardenable alloys
[NASA-CASE-XNP-01311] N75-29236
Heat treatment of the VT22 alloy
[AD-A006005] N75-29256

HEATING EQUIPMENT
A leading edge heating array and a flat surface heating array - operation, maintenance and repair manual
[NASA-CR-144357] N75-29088

HEAVY IONS
Nuclear structure research --- discussion of heavy ions, rare earth elements, and energy levels
N75-29875

HELICOPTER DESIGN
Failsafe/safe-life interface criteria
[AD-A006131] N75-29462

HELICOPTER WAKES
Unsteady vortex lattice techniques applied to wake formation and performance of the statically thrusting propeller
[NASA-CR-132686] N75-29031

HELICOPTERS
Automatic external load aquisition by helicopter
[AD-A005051] N75-29097
Application of the helicopter KA-26 to large-scale aerial photography
[AD-A005950] N75-29393
Mechanical failure prognosis through oil debris monitoring
[AD-A006190] N75-29459

HETERODYNING
A heterodyne detection FM-CW laser radar using a 10 micrometers source
[AD-A005865] N75-29419

HETEROGENEITY
Stabilization of the flame of heterogeneous mixtures
[AD-A006010] N75-29230

HEURISTIC METHODS
An evaluation of heuristic scheduling rules by using a zero-one linear programming approach
[AD-A006348] N75-29458

HIERARCHIES
Hierarchical models of very large problems, dilemmas, prospects, and an agenda for the future
N75-29847

HIGH ENERGY INTERACTIONS
High energy halogen chemistry
[AD-A006468] N75-29227

HIGH SPEED
High speed reacting and radiating flows --- radiative heat transfer - graphite/surface reactions/oxidation - reentry physics
[AD-A006460] N75-29374

HIGH STRENGTH ALLOYS
Material evaluation program, high-temperature nitriding environment
[NASA-CR-144382] N75-29216
Determination of structural engineering properties of incoloy 903 and CTX-1 alloys
[NASA-CR-120673] N75-29247

HIGH TEMPERATURE
Hot corrosion in burner gas at 1200 C
[NASA-TT-F-16509] N75-29245

HIGH TEMPERATURE ENVIRONMENTS
Material evaluation program, high-temperature nitriding environment
[NASA-CR-144382] N75-29216
Trielectrode capacitive pressure transducer
[NASA-CASE-ARC-10711-2] N75-29320

HIGH TEMPERATURE RESEARCH
Reaction between refractory metals and insulating nitrides at high temperatures
[NASA-TT-F-16477] N75-29239

HIGH TEMPERATURE TESTS
Fretting of titanium at temperatures to 650 C in air
[NASA-TN-D-8048] N75-29250
Fatigue strength of the titanium alloys Ti 8Al 1Mo 1V, Ti 5Al 2.5Sn and Ti 6Al 4V at high temperatures --- 246 C and 340 C
[ISD-161] N75-29251

HIGH VACUUM
Resistance of Nadsoniella nigra var. hesuelica to the action of a high vacuum
[NASA-TT-F-16503] N75-29732

HISTOGRAMS
Visibility on the Atlantic Ocean and the North Sea
[PHL-1974-32] N75-29688

HOLES
Film cooling effectiveness from rows of holes under simulated gas turbine conditions
[ARC-CP-1303] N75-29367

HOLOGRAPHIC INTERFEROMETRY
An application of holographic interferometry to gun barrel erosion
[AD-A005867] N75-29400
Fundamentals of holographic interferometry
[REPT-182] N75-29409
Large diameter active mirror with holographic figure sensing --- thin mirror active system
[AD-A006211] N75-29892

HORIZONTAL TAIL SURFACES
Longitudinal motions of aircraft involving high angles of attack
[ARC-R/M-3753] N75-29094

HOSPITALS
A simulation of the Emergency Clinic and Department of Primary Care at the Wright-Patterson AFB Medical Center
[AD-A006345] N75-29750

HOT-WIRE FLOWMETERS
A hot-wire surface gage for skin friction and separation detection measurements
[NASA-TM-X-62465] N75-29384

HOUSINGS
Single-wing current meter housing --- reliability engineering
[AD-A006281] N75-29398

HULLS [STRUCTURES]
Analysis of plastic models of ship structures using holograph and strain gages --- holographic displacement and vibration analyses
[AD-A006269] N75-29399

HUMAN BEHAVIOR
Behavioural observations of passengers boarding a slow speed conveyor
[TT-7411] N75-29759

HUMAN BODY
Basic biomechanical properties of the human neck related to lateral hyperflexion injury
[PB-241246/8] N75-29747

HUMAN FACTORS ENGINEERING
The predicament of aeronautical engineering education and what we can do about it
N75-29005
Man as a precious resource: The enhancement of human effectiveness in flight operations
[AD-A006353] N75-29766
Methods of handling sequence effects in human factors engineering experiments
[AD-A006240] N75-29770
Human comfort response to random motions with a dominant vertical motion
[NASA-TM-X-72691] N75-29774
Vibration as an artificially created human factor of the environment
[NASA-TT-F-16475] N75-29776
Statistics in human engineering --- military flying personnel
[RAE-TR-74166] N75-29782

HUMAN PERFORMANCE
Effects of hypnotic drugs on performance before and after sleep
[NASA-CR-143311] N75-29743
Effects of 60 Co on electrical self-stimulation of the brain and blood pressure
[AD-A006428] N75-29751
The effect of extremely low frequency radiation on human performance: A preliminary study
[AD-A005898] N75-29756
Manipulating the number and type of adaptive variables in training
[AD-A006229] N75-29764
Man as a precious resource: The enhancement of human effectiveness in flight operations
[AD-A006353] N75-29766
Evaluating maintenance performance test administrator's manual and text subject's instructions for criterion referenced job task performance tests for electronic maintenance
[AD-A005785] N75-29768
Methods of handling sequence effects in human factors engineering experiments
[AD-A006240] N75-29770

HUMAN REACTIONS
Annoyance resulting from intrusion of aircraft sounds upon various activities
[NGR-43-008-008] N75-29112

HUMIDITY
On the wind, temperature, and humidity fields in the vicinity of an east-west line of showers
N75-29662

HUMIDITY MEASUREMENT
Preliminary analysis of a selective sample of GATE ship and aircraft data --- upper atmosphere temperature and humidity
N75-29659

HURRICANES
Project Stormwater: The collection of bathythermographic data and airborne radiation sea surface temperature measurements in the wake of hurricane Irah
[AD-A005909] N75-29717

HYDRATES
Study of the quality of autonomous and separate control of monohydrate concentration and level in sulfuric acid plants
[NASA-TT-F-16491] N75-29214

HYDRAULIC EQUIPMENT
F-89 hydraulic actuator combinatorial geometric representation
[AD-A006435] N75-29101
Fluidic hydraulic element with high input resistance
[AD-A006078] N75-29372
West German self-propelled cranes with hydraulic booms
[AD-A005948] N75-29439
Design of hydraulic rollers for treating ceramic materials with consideration --- of reliability parameters
[AD-A006099] N75-29444
Rio Blanco massive hydraulic fracturing demonstration
[PB-240849/0] N75-29614
Aerospace Research. Bi-monthly Bulletin No. 1974-1 --- influence of combustion and hydraulic systems on pogo effects, combustion stability in swirling flow, metal matrix composite materials
[ESRO-TT-144] N75-29988
Transfer matrices of hydraulic systems. Theoretical and experimental study --- propellant transfer noting pogo effect
N75-29990

HYDRAZINES
Overall reaction rate and stoichiometry for thermal decomposition of hydrazine
N75-29266

HYDRAZONIUM COMPOUNDS
Kinetics and mechanism of the thermal decomposition of salts of hydrazonium
[AD-A005994] N75-29223

HYDROCARBON FUELS
The long term energy problem and aeronautics
N75-29012

HYDROCARBONS
Ramjet technology. Chapter 6: Ramjet fuels
[AD-A006114] N75-29124
Application of deuterized compounds for the study of kinetics and mechanism of the thermal conversions of hydrocarbons
[AD-A006007] N75-29184
Thermal conductivity of liquid halogenated aromatic hydrocarbons
[ESDU-74014] N75-29198
Thermal conductivity of liquid aromatic hydrocarbons
[ESDU-74007] N75-29199
Development and utility of reactivity scales from smog chamber data --- hydrocarbons
[PB-241248/4] N75-29598
Biodegradation of some polynuclear aromatic petroleum components by marine bacteria
[AD-A006346] N75-29733

HYDROGEN
The process of ignition and combustion of hydrogen in a supersonic flow
[AD-A006012] N75-29228
Analysis of the structure of the diffusion flames of hydrogen
[AD-A006008] N75-29229
Rate constants of some elementary stages of the reaction of fluorine with hydrogen
[AD-A006011] N75-29231

HYDROGEN EMBRITTLEMENT
Effects of environment on the mechanical behavior of metals --- prevention of stress corrosion cracking and hydrogen embrittlement
[AD-A006299] N75-29260

HYDROGEN PLASMA
Experiments on magnetoacoustic resonances in a rotating plasma
[TRITA-EPP-74-24] N75-29898

HYDROLOGY
The use of LANDSAT DCS and imagery in reservoir management and operation --- Saint John River, Maine and Canada
[E75-10378] N75-29520

HYDROPLANING
Porous friction surface course --- for airport pavements
[AD-A009012] N75-29134
HYDROSTATIC PRESSURE
Experimental test of the load bearing capacity of smooth glass fibre reinforced plastic hollow cylinders subjected to external hydrostatic pressure
[BLL-NEL-TT-2564-(6075.461)] N75-29463
Hydrostatic pressure equilibrated tensiometer
[AD-A006282] N75-29710
HYDROXYL EMISSION
Free radical OH, a molecule of astrophysical and aeronomic interest --- radio sources [astronomy] - spectroscopic analysis
[NASA-SP-373] N75-29960
HYGIENE
Study to define and verify the personal oral hygiene requirements for extended manned space flight: Oral physiology and microbiology in Skylab manned space missions
[NASA-CR-144361] N75-29740
HYPERSONIC NOZZLES
Crossflow in two-dimensional asymmetric nozzles
[NASA-TN-D-7999] N75-29365

I

ICELAND
World climate and world food systems 1: Heyuppskera, an heuristic model for hay yield in Iceland
[PB-240870/6] N75-29690
IDEAL GAS
A form of the supersonic flow equations for an ideal gas
[ARC-R/M-3757] N75-29042
IDENTIFYING
Complete identification of a class of nonlinear systems from steady state frequency response
[AD-A005829] N75-29814
IGNITION
The process of ignition and combustion of hydrogen in a supersonic flow
[AD-A006012] N75-29228
IMAGE CONTRAST
The performance of edge operators on images with texture
[AD-A006230] N75-29891
IMAGE ENHANCEMENT
Interpolation of ERTS-1 multispectral scanner data
[NASA-CR-141861] N75-29530
IMAGE INTENSIFIERS
Manufacturing methods and technology program Automated Image Device Evaluator [AIDE]
[AD-A006546] N75-29338
IMAGING TECHNIQUES
Image processing and data reduction of Apollo low light level photographs
[NASA-CR-144659] N75-29389
Breadboard linear array scan imager program
[NASA-CR-143828] N75-29887
The performance of edge operators on images with texture
[AD-A006230] N75-29891
IMPACT LOADS
Basic biomechanical properties of the human neck related to lateral hyperflexion injury
[PB-241246/8] N75-29747
IMPACT PREDICTION
A computer simulation of release parameter effects upon bomb impact distributions
[AD-A006347] N75-29844
IMPACT TESTS
The impact between a liquid drop and an elastic half-space
[PB-241155/1] N75-29378
IMPEDANCE MATCHING
Efficiency of a phased array antenna as a function of phase shifter loss and mismatch due to mutual coupling
[PHL-1974-31] N75-29321
IMPURITIES
Effect of oxygen impurity on the pressure-sintering of aluminum nitride
[NASA-TT-F-16452] N75-29237
INCOMPRESSIBLE FLOW
Second-order small-perturbation theory for finite wings in incompressible flow --- two dimensional swept wings
[ARC-R/M-3759] N75-29052
INCOMPRESSIBLE FLUIDS
Lagrangian description of steady waves
[BLL-M-23564-(5828.4F)] N75-29860
INDIANA
Study of the utilization of EREP data from the Wabash River Basin --- Lake Monroe and Ft. Wayne, Indiana
[E75-10377] N75-29519
The application of remote sensing technology to the solution of problems in the management of resources in Indiana
[NASA-CR-143317] N75-29527
INDUSTRIAL PLANTS
Development document for effluent limitations guidelines and new source performance standards for the primary aluminum smelting subcategory of the aluminum segment of the nonferrous metals manufacturing point source category
[PB-240859/9] N75-29576
Development document for effluent limitations guidelines and new source performance standards for the phosphorus derived chemicals segment of the phosphate manufacturing point source category
[PB-241018/1] N75-29579
An analysis of the effectiveness of ASPR in proving guidance for the utilization of government-owned industrial plant equipment
[AD-A006351] N75-29938
INDUSTRIAL SAFETY
Protective clothing: Assessment of need, volume 1
[PB-241167/6] N75-29785
Protective clothing: Assessment of need, Volume 2
[PB-241168/4] N75-29786
INDUSTRIAL WASTES
Removal of manganese from mine drainage by ozone and chlorine
[PB-241143/7] N75-29541
Development document for effluent limitations guidelines and new source performance standards for the steam electric power generating point source category
[PB-240853/2] N75-29575
Development document for effluent limitations guidelines and new source performance standards for the primary aluminum smelting subcategory of the aluminum segment of the nonferrous metals manufacturing point source category
[PB-240859/9] N75-29576
Development document for effluent limitations guidelines and new source performance standards for the synthetic polymer segment of the plastics and synthetic materials manufacturing point source category
[PB-240862/3] N75-29577
Development document for effluent limitations guidelines and new source performance standards for the formulated fertilizer segment of the fertilizer manufacturing point source category
[PB-240863/1] N75-29578
Development document for effluent limitations guidelines and new source performance standards for the phosphorus derived chemicals segment of the phosphate manufacturing point source category
[PB-241018/1] N75-29579
The effects of air and water pollution controls on solid waste generation, 1971 - 1985. Executive summary
[PB-240739/2] N75-29600
INDUSTRIES
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
Technical progress and industrial development in a developing economy --- urban development
[AD-A005734] N75-29951
INEQUALITIES
V-positivity, poverses and an economic global unicity theorem of Gale and Nikaido
[AD-A005901] N75-29802
F-convex functions
[AD-A005900] N75-29836
INERTIAL NAVIGATION
Some indicators for inertial navigation systems reliability
[AD-A006439] N75-29085
Ball bearings for inertial type gyroscopes: Low speed operation study
[LRBA-E-602-NT-26/SIE] N75-29437
Cost estimating relationships for predicting life cycle costs of inertial measurement unit maintenance
[AD-A006344] N75-29457
INFESTATION
Aerial spray evaluation pine butterfly test, Bitterroot National Forest, Montana, 1973
[AD-A006256] N75-29401
INFORMATION RETRIEVAL
Information content of the data obtained by remote sensing of the parameters of the environment and the earth's resources from space
[NASA-TT-F-16435] N75-29533
Automatic generation of identification records for archives building --- information retrieval - documentation, computer techniques
[ISS-T-74/6] N75-29941
Machine-aided retrieval
[AD-A006500] N75-29947
INFORMATION SYSTEMS
Fatigue data bank and data analysis investigation, phase 1
[PB-240261/8] N75-29254
AFBITS experimental equipment evaluations
[AD-A006192] N75-29309
Allocation methodology. Distance determinations and population catchment determinations, and their applicability to practical planning --- urban planning - information systems
[NASA-TT-F-16495] N75-29856
Implementation of a mini-computer based information system. Part 18. A general file dump program for the Varian 620 computer --- for debugging and detection of machine failures
[AD-A008519] N75-29945
INFRARED DETECTORS
A heterodyne detection FM-CW laser radar using a 10 micrometers source
[AD-A005865] N75-29419
Experimental studies of the collisional excitation of infrared active vibrational stretch modes in CO2 and H2O with an intersecting, hyperthermal molecular beam apparatus, volume 1
[AD-A006237] N75-29886
INFRARED IMAGERY
A comparison of infrared imagery and video pictures in the estimation of daily rainfall from satellite data
[COM-75-10435/6] N75-29698
Study of infrared solid state images using charge transport devices
[AD-A005736] N75-29925
INFRARED LASERS
Study of water absorption lines in the near infrared
[AD-A005636] N75-29234
Investigation of DF laser propagation
[AD-A005631] N75-29608
INFRARED PHOTOGRAPHY
The low-level structure of an African disturbance determined by aircraft reconnaissance --- compared with satellite IR photography
N75-29640
INFRARED RADIATION
Infrared radiation budget of the Harmattan haze --- West Africa
N75-29674
INFRARED SPECTROMETERS
Firebird interferometer --- for observation of infrared plume emission
[AD-A005815] N75-29395
INFRARED SPECTROSCOPY
Study of water absorption lines in the near infrared
[AD-A005636] N75-29234
A spectroscopic study of California smog
[PB-241022/3] N75-29594
INJECTORS
Fine orifice injector development
[AD-A006204] N75-29418
INLET NOZZLES
Noise suppression with high Mach number inlets
[NASA-CR-143314] N75-29115
INLET PRESSURE
Experimentally determined aeroacoustic performance and control of several sonic inlets
[NASA-TM-X-71767] N75-29353
INPUT/OUTPUT ROUTINES
ACS batch processing system. Volume 3: System and functional program description
[AD-A005306] N75-29539
INSECTS
Aerial spray evaluation pine butterfly test, Bitterroot National Forest, Montana, 1973
[AD-A006256] N75-29401
Processing ERTS and Aircraft MSS data with the General Electric Image 100 system
[E75-10362] N75-29504
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
INSTRUMENT LANDING SYSTEMS
An overview of the FAA engineering and development programs with highlights of fiscal years, 1975-1976 --- progress in aircraft safety, instrument landing systems, radar navigation, and air traffic control
[AD-A010266] N75-29063
Spectral analysis of Doppler MLS video data
[AD-A006436] N75-29072
Reliable line signaling techniques for the FAA GRN-27[V] and CAT-3 ILS
[AD-A009881] N75-29077
TACAN and ILS station evaluation report, Loring AFB, Maine
[AD-A006416] N75-29084
Baseline measurement of the noise generated by a short-to-medium range jet transport flying standard ILS approaches and level flyovers
[NASA-TM-X-72760] N75-29119
FAA lightning protection study: Lightning protection requirements for AIL Mark 1 instrument landing system
[AD-A009342] N75-29133
FAA lightning protection study: Lightning protection requirements for Wilcox Mark I/C instrument landing system
[AD-A009010] N75-29136
INSTRUMENT PACKAGES
Flame resistant elastomeric polymer development --- for use in space shuttle instrument packaging
[NASA-CR-144362] N75-29264
INTEGERS
Parametric integer programming
[AD-A006401] N75-29796
The Monte Carlo method of evaluating integrals
[AD-A005891] N75-29837

INTEGRAL EQUATIONS
Constructive methods for solving delta sub 4, sup 2 u + A delta sub 4 u sub T + C delta sub 4 u + D u equals 0
[AD-A006261] N75-29839
INTEGRATED CIRCUITS
Semiconductor microelectronics --- integrated circuits
[AD-A006074] N75-29928
INTEGRATORS
Integral operators for parabolic equations and their application
[AD-A006244] N75-29833
INTELLIGIBILITY
Voices in orbit --- speech analysis for monitoring astronaut performance
[NASA-TT-F-16499] N75-29758
INTELSAT SATELLITES
Some results of electron content measurements at Tortosa from the Intelsat 2-F3 transmissions
[AD-A006202] N75-29610
INTERFACES
Discrete address beacon system/air traffic control interface configuration document. Volume 2: Enroute hardware for phase 1
[AD-A009307] N75-29081
INTERFACIAL ENERGY
Wear and interfacial transport of material
[NASA-TM-X-71781] N75-29909
INTERFACIAL TENSION
Non-linear effects of surface tension in cavity flow
[AD-A006036] N75-29375
Fiber reinforced solids possessing great fracture toughness: The role of interfacial strength
[NASA-CR-143287] N75-29474
INTERFEROMETERS
Interferometric instrumentation for particle size analysis
[AD-A006136] N75-29425
INTERFEROMETRY
Observations with a VLB array. The sources 3C120, 3C273, 2134 and 004, and 3C84, 3 --- radio sources
[AD-A005769] N75-29967
INTERGRANULAR CORROSION
Study of grain boundary segregation relating to intergranular fracture
[AD-A006422] N75-29934
INTERMITTENCY
Intermittent positive control computer algorithm for test bed experiments --- collision avoidance - aircraft guidance
[AD-A009215] N75-29068
INTERNAL COMBUSTION ENGINES
Performance of Army engines with leaded and unleaded gasoline. Phase 2: Field study evaluation
[AD-A005577] N75-29440
INTERNAL COMPRESSION INLETS
A throat-bypass stability system for a YF-12 aircraft research inlet using self-acting mechanical valves
[NASA-TM-X-71779] N75-29128
INTERNATIONAL COOPERATION
Science, technology, and detente --- international cooperation - U.S.S.R., United States of America
[PB-240818/5] N75-29949
INTERNATIONAL RELATIONS
Oil and US policy
[AD-A006473] N75-29558
Science, technology, and detente --- international cooperation - U.S.S.R., United States of America
[PB-240818/5] N75-29949
INTERNATIONAL SYSTEM OF UNITS
The impact of metrication on the Defense standardization program
[AD-A006038] N75-29280
INTERPLANETARY FLIGHT
Study of outer space by reaction devices --- classical mechanics - interplanetary flight - escape rockets/jet propulsion
[NASA-TT-F-15571] N75-29141
INTERPLANETARY SPACECRAFT
Study of outer space by reaction devices --- classical mechanics - interplanetary flight - escape rockets/jet propulsion
[NASA-TT-F-15571] N75-29141
INTERPOLATION
On remainders and the convergence of cardinal spline interpolation for almost periodic functions
[AD-A006544] N75-29825
INVARIANCE
Some contributions to multivariate nonparametric methods
[AD-A006154] N75-29832
Mixtures of invariant non-ergodic probabilities
[RR-162/MBR/1] N75-29840
INVISCID FLOW
Transonic data memorandum: Second-order method for estimating the subcritical pressure distribution on a two-dimensional aerofoil in compressible inviscid flow
[ESDU-72025] N75-29029
Higher order wind tunnel corrections for a two-dimensional circular arc lifting aerofoil in a closed rectangular wind tunnel
[ARL/A-NOTE-349] N75-29034
Three-dimensional inviscid effects in axial flow turbomachinery and limitation of cascade theory
[NAL-TR-379T] N75-29355
ION ACOUSTIC WAVES
A large quiescent magnetized plasma for wave studies
[AD-A006461] N75-29900
ION BEAMS
Experiments --- studies using polarized beams and deuteron irradiation N75-29876
ION ENGINES
Charge-exchange plasma generated by an ion thruster
[NASA-CR-134844] N75-29175
Experimental investigation of beams exhausted from a 5cm mercury electronbombardment ion engine
[NAL-TR-398] N75-29176
ION IMPLANTATION
Investigation of ion implantation as a doping technique for the 3-5 semiconductors and ternary alloy systems
[AD-A006465] N75-29926
ION SOURCES
Development of high intensity ion sources --- aluminum oxides
[AD-A005824] N75-29906
IONIC CRYSTALS
Molecular dynamics calculators at Orsay --- a discussion of molecular structure, ionic crystals, and lattice vibrations
[AD-A006027] N75-29924
IONIZATION
Analysis of the ground term energy levels for triply ionized neodymium in yttrium orthovanadate
[AD-A006017] N75-29873
IONOSPHERE
Ionospheric plasma effects
[AD-A006242] N75-29612
IONOSPHERIC DISTURBANCES
Ionospheric effects on transionospheric measurements of range and range difference
[AD-A006118] N75-29314
IONOSPHERIC ELECTRON DENSITY
Some results of electron content measurements at Tortosa from the Intelsat 2-F3 transmissions
[AD-A006202] N75-29610
Moment method solutions for the impedance of asymmetrically driven RF probes in the collisional ionospheric magnetoplasma
[AD-A006200] N75-29611
Simultaneous observation of TEC from North and South Hemisphere during the 30th June 1973 solar eclipse
[AD-A006201] N75-29983
IONOSPHERIC SOUNDING
Balloon sounding of the atmosphere
[NASA-TT-F-16380] N75-29635
Airborne meteorological instrumentation system and data reduction
[AD-A009665] N75-29636
IRISES [MECHANICAL APERTURES]
A wide-angle scan matching technique for an infinite plane phased array antenna
[PHL-1974-33] N75-29322
IRON COMPOUNDS
Magnetic and electrical properties of novel compounds in the alkaline earth-transition metal-sulfur and selenium systems
[AD-A005723] N75-29918
ISLANDS
Remote sensing over North Merritt Island --- space shuttle runway
[E75-10371] N75-29513
ISOTOPIC LABELING
Application of deuterized compounds for the study of kinetics and mechanism of the thermal conversions of hydrocarbons
[AD-A006007] N75-29184
ISOTROPIC MEDIA
Dispersion relation for electron waves propagating in an isotropic plasma containing Maxwellian and suprathermal electrons N75-29881
ITERATIVE SOLUTION
The incremental solution of some basic problems in elastic stability --- using Newton-Raphson method and nonlinear equations
[NLR-TR-74005-U] N75-29490
Stepwise Iterative Fourier Transform: The SIFT
[NASA-CR-144377] N75-29820

J

JET AIRCRAFT
Vibrations measured in the passenger cabins of two jet transport aircraft
[NASA-TN-D-7923] N75-29037
JET AIRCRAFT NOISE
Establishing certification/design criteria for advanced supersonic aircraft utilizing acceptance, interference, and annoyance response to simulated sonic booms by persons in their homes
[AD-A009656] N75-29090
Estimation of subsonic far-field jet-mixing noise
[ESDU-74002] N75-29103
JET ENGINE FUELS
Ramjet technology. Chapter 6: Ramjet fuels
[AD-A006114] N75-29124
JET ENGINES
Evaluation by step response tests of prototype relief valves designed for YF-12 inlet stability bleed system
[NASA-TM-X-3262] N75-29118
Digital fuel controller for lift jet engine
[NAL-TR-389] N75-29122
JET EXHAUST
Thrust/drag analysis for a front fan nacelle having two separate co-axial exhaust streams --- for turbofan engines
[ARC-CP-1311] N75-29049
JET FLOW
Analysis of an axisymmetrical turbulent pulsating jet
[VKI-TN-104] N75-29045
The disturbance of the mixing region of two planar jets by means of a shock wave
[NASA-TT-F-16507] N75-29358
JET IMPINGEMENT
Numerical computation of three-dimensional blunt body flow fields with an impinging shock
[NASA-CR-143312] N75-29038
JET PROPULSION
Study of outer space by reaction devices --- classical mechanics - interplanetary flight - escape rockets/jet propulsion
[NASA-TT-F-15571] N75-29141
JET THRUST
Thrust/drag analysis for a front fan nacelle having two separate co-axial exhaust streams --- for turbofan engines
[ARC-CP-1311] N75-29049
JOSEPHSON JUNCTIONS
An investigation of the SNS Josephson junction as a three-terminal device
[NASA-CR-143254] N75-29907
JUNCTION TRANSISTORS
An investigation of the SNS Josephson junction as a three-terminal device
[NASA-CR-143254] N75-29907
JUPITER [PLANET]
Interpretation of surface features of Europa obtained from occultations by Io --- astronomical observations - Jupiter [planet]
[NASA-CR-143273] N75-29958
JUPITER PROBES
Jupiter orbiter. Study of critical aspects of a joint ESA/NASA project --- based on Pioneer H for Jupiter atmosphere mapping
[MBB-UR-V-77-74] N75-29975

K

KARMAN-BODEWADT FLOW
Numerical integration of the momentum-integral equations and application of the results to the flow between rotating disks
[VTH-183] N75-29369
KEROSENE
Combustion of rich kerosene-air mixtures in tunnel type chamber
[AD-A005995] N75-29222
KETONES
Normal melting points, boiling points and critical points of n-alkyl aldehydes and ketones
[ESDU-71023] N75-29206
KIRCHHOFF LAW
An investigation of electromagnetic wave scattering from rough surfaces, based on a comparison between vectorial and scalar Kirchhoff methods
[FOA-B-20002-E1] N75-29862

L

LABORATORY EQUIPMENT
In-situ separator --- for microorganisms
[AD-A006274] N75-29734
LABYRINTH
On the otoliths and their origin
[NASA-TT-F-16470] N75-29741
LAGRANGE COORDINATES
Lagrangian description of steady waves
[BLL-M-23564-[5828.4F]] N75-29860
LAKE HURON
Summary of synoptic meteorological observations for Great Lakes areas. Volume 2: Lake Huron and Georgian Bay
[COM-75-10364/8] N75-29694
LAKE MICHIGAN
Summary of synoptic meteorological observations for Great Lakes areas. Volume 3: Lake Michigan
[COM-75-10365/5] N75-29695

LAKE ONTARIO
Spatial and temporal variations of the turbulent fluxes of heat, momentum, and water vapor over Lake Ontario during IFYCL
[COM-75-10481/0] N75-29700

LAKE SUPERIOR
Characterization of vessel wastes in Duluth-Superior Harbor
[PB-241081/9] N75-29585
Summary of synoptic meteorological observations for Great Lakes areas. Volume 4: Lake Superior
[COM-75-10366/3] N75-29696

LAKES
Study of the utilization of EREP data from the Wabash River Basin --- Lake Monroe and Ft. Wayne, Indiana
[E75-10377] N75-29519

LAMINAR BOUNDARY LAYER
Numerical integration of the momentum-integral equations and application of the results to the flow between rotating disks
[VTH-183] N75-29369
A numerical study on the effects of viscosity on the performance of CO2 gasdynamic laser --- using laminar boundary layer model and turbulent wake model
[ISAS-528-VOL-40-NO-8] N75-29408

LAMINAR FLOW
Information on the use of data items in the series bodies 02.04
[ESDU-02.04.00] N75-29028
A numerical method for the solution of the two-dimensional steady laminar boundary layer equations
[VKI-TN-103] N75-29044

LAMINATES
Normal incidence absorption coefficients and acoustic impedances of typical single layer fibrous lining materials --- fibermetals and polyimide laminates
[ESDU-74003] N75-29185
Stiffnesses of laminated flat plates
[ESDU-75002] N75-29466
Stress analysis of laminated flat plates
[ESDU-74039] N75-29467
Failure modes of angle ply laminates
[AD-A005737] N75-29493

LAND
A review of clutter, 1974
[RRE-TN-783] N75-29300

LAND USE
A regional land use survey based on remote sensing and other data --- Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona
[E75-10374] N75-29516
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525
Land use forms and the environment. An executive summary
[PB-241093/4] N75-29584

LANDING LOADS
A computer program for rigid pavement evaluation
[AD-A006140] N75-29496

LANDSAT 1
Interpolation of ERTS-1 multispectral scanner data
[NASA-CR-141861] N75-29530

LANGUAGES
Computer generation of natural language from a deep conceptual base
[AD-A005041] N75-29809
Computational understanding: Analysis of sentences and context
[AD-A005040] N75-29811

LANTHANUM COMPOUNDS
Electrical and thermoemission properties of alloys lanthanum and cerium hexaborides with transition metals
[AD-A005980] N75-29921

LARGE SCALE INTEGRATION
Use of a microprocessor in a supervisory control application
[AD-A006119] N75-29791

LARGE SPACE TELESCOPE
Electronic magnification for astronomical camera tubes
[NASA-CR-143827] N75-29961

LASER APPLICATIONS
Experiment definition phase shuttle laboratory: LDRL-10.6 experiment
[NASA-CR-144658] N75-29161
Experiment definition phase shuttle laboratory LDRL-10.6 experiment --- applying optical communication
[NASA-CR-144656] N75-29164
Particulate contamination spectrometer. Volume 1: Technical report
[NASA-CR-144375] N75-29407
Fundamentals of holographic interferometry
[REPT-182] N75-29409
Investigation of high power MHD gas lasers
[AD-A006298] N75-29420
Development of tunable semiconductor lasers for application to air pollution measurements
[PB-241030/6] N75-29423
Interferometric instrumentation for particle size analysis
[AD-A006136] N75-29425
New machinery and materials --- a discussion of reinforcing fibers, whisker composites, nickel alloys, and laser applications
[AD-A005953] N75-29438
Investigation of DF laser propagation
[AD-A005631] N75-29608
Determination of certain parameters of clouds with the aid of a laser locator
[BLL-M-23632-[5828.4F]] N75-29627

LASER MODE LOCKING
Gigawatt CO2 laser for laser-target interaction studies
[DREV-R-4017/75] N75-29411
Passive mode-locking of a large volume TEA-CO2 laser using an unstable resonator configuration
[DREV-R-4016/75] N75-29412

LASER OUTPUTS
Light conversion in dye lasers
[BLL-M-23559-[5828.4F]] N75-29405
Short-term spot size and beam wander in a turbulent medium
[AD-A006032] N75-29413
Radiation scattering by atmospheric aerosols
[AD-A006081] N75-29889

LASER PLASMAS
Development of high intensity ion sources --- aluminum oxides
[AD-A005824] N75-29906

LASER RANGE FINDERS
CO2 laser ranging systems study
[NASA-CR-144655] N75-29410
Accuracy of site coordinates obtainable by a mobile lunar laser station
[NASA-CR-143052] N75-29959

LASERS
Problems of the gamma ray laser
[AD-A006197] N75-29424
Irradiance scintillations: Comparison of theory with experiment
[AD-A006365] N75-29888

LATERAL CONTROL
Differential elevon effectiveness lateral control optimization and elevon hinge moment investigation on a 0.015 scale space shuttle orbiter model 49-0 [140A/B/C modified] in the AECD VKF wind tunnel A [0A115]
[NASA-CR-141534] N75-29165

LATERAL STABILITY
Free-flight model dynamic stability measurements on a not-so-slender wing/fin combination at zero and small lift, Mach number equals 0.8 to 2.0
[ARC-CP-1315] N75-29051

LATTICE VIBRATIONS
Molecular dynamics calculators at Orsay --- a discussion of molecular structure, ionic crystals, and lattice vibrations
[AD-A006027] N75-29924

LAW [JURISPRUDENCE]
Legal aspects of phosphate mining in North Carolina
[COM-75-10504/9] N75-29540

LEAD [METAL]
An ellipsometric investigation of the underpotential deposition of lead on gold
[AD-A005915] N75-29257

LEAD COMPOUNDS
Performance of Army engines with leaded and unleaded gasoline. Phase 2: Field study evaluation
[AD-A005577] N75-29440

LEAD SULFIDES
Thermoelectric properties of natural lead sulfide and synthetic N-lead sulfide
[AD-A006082] N75-29564

LEADING EDGES
A leading edge heating array and a flat surface heating array - operation, maintenance and repair manual
[NASA-CR-144357] N75-29088

LEARNING
Deterministic multiple cue learning. Part 1: Effects of cue intercorrelation and presentation order
[IZF-1974-20-PT-1] N75-29760

LEPTONS
Weak non leptonic decays of charmed hadrons
[ISS-P-75/4] N75-29912

LEVITATION
Tracked levitated research vehicle periodic test summary report: Primary suspension; aeropropelled
[PB-240994/4] N75-29957

LIFE [DURABILITY]
Thrust chamber life prediction. Volume 1: Mechanical and physical properties of high performance rocket nozzle materials
[NASA-CR-134806] N75-29238

LIFE SUPPORT SYSTEMS
Space food preparation and packaging. A menu for cosmonauts and 'space' bread
[NASA-TT-F-16467] N75-29720
Space life support technology for a modular integrated utility system N75-29723
Comparative characteristics of the main types of climatic clothing of Vostok Station personnel --- in Antarctic region
[AD-A005876] N75-29788
A cosmic model of the biosphere
[NASA-TT-F-16460] N75-29968

LIFT DEVICES
A lifting surface theory method for treating swept or slender wings in attached subsonic flow
[ARC-R/M-3760] N75-29053

LIFT FANS
Summary of model VTOL lift fan tests conducted at NASA Lewis Research Center
[NASA-TM-X-71778] N75-29106

LIGHT GAS GUNS
Preliminary analysis of a light-gas gun-driven gas dynamic laser
[DREV-4011/75] N75-29406

LIGHT SCATTERING
Particulate contamination spectrometer. Volume 1: Technical report
[NASA-CR-144375] N75-29407
Radiation scattering by atmospheric aerosols
[AD-A006081] N75-29889

LIGHT SOURCES
Electric arc light source having undercut recessed anode
[NASA-CASE-ARC-10266-1] N75-29318

LIGHT TRANSMISSION
Mass-production model of automatic RDV-1 photometer for measuring and recording atmospheric transparency
[AD-A006076] N75-29394
Short-term spot size and beam wander in a turbulent medium
[AD-A006032] N75-29413
Irradiance scintillations: Comparison of theory with experiment
[AD-A006365] N75-29888

LIGHTING EQUIPMENT
FAA lightning protection study: Lightning protection requirements for the ARTS 3 system --- circuit protection - radar
[AD-A009662] N75-29131

LIGHTNING
FAA lightning protection study: Lightning protection requirements for the ARTS 3 system --- circuit protection - radar
[AD-A009662] N75-29131
FAA lightning protection study: Lightning protection requirements for AIL Mark 1 instrument landing system
[AD-A009342] N75-29133
FAA lightning protection study: Lightning protection requirements for Wilcox Mark I/C instrument landing system
[AD-A009010] N75-29136

LIMBS [ANATOMY]
Some studies relating to limb flailing after an emergency escape from an aircraft
[AD-A005699] N75-29752

LIMITER CIRCUITS
Broadband ferrite limiters --- microwave equipment
[AD-A005279] N75-29328

LIMITS [MATHEMATICS]
Limit theorems for the [A,B] process
[RR-168/PSC/4] N75-29843

LINEAR ARRAYS
Evaluation of algorithms for linear array beamforming on the AN/UYK-17 [XB-1] [V] signal processing element
[AD-A006251] N75-29315
The estimation of the direction of radar targets
[PHL-1975-01] N75-29324
Breadboard linear array scan imager program
[NASA-CR-143828] N75-29887

LINEAR PREDICTION
Applications of the PARCOR coefficients for linear prediction of stationary processes --- partial autocorrelation coefficient for digital voice processing
[TB-173] N75-29302

LINEAR PROGRAMMING
An evaluation of heuristic scheduling rules by using a zero-one linear programming approach
[AD-A006348] N75-29458
Parametric integer programming
[AD-A006401] N75-29796
Primal geometric programs treated by linear programming
[AD-A005902] N75-29801
V-positivity, poverses and an economic global unicity theorem of Gale and Nikaido
[AD-A005901] N75-29802

LINEAR SYSTEMS
The structure of robust observers
[NASA-TM-X-64950] N75-29819
Decentralized regulation of dynamic systems --- for controlling large scale linear systems N75-29851

LINEAR TRANSFORMATIONS
Optimal linear and nonlinear feature extraction based on the minimization of the increased risk of misclassification --- Bayes theorem - statistical analysis/data processing
[NASA-CR-144385] N75-29821

LININGS
Fracture control method for composite tanks with load sharing liners
[NASA-CR-134758] N75-29449
LIQUEFIED NATURAL GAS
Technology and current practices for processing, transferring and storing liquefied natural gas
[PB-241048/8] N75-29271
LIQUID BEARINGS
Stability and transient motion of a hydrodynamic horizontal three-lobe bearing system
N75-29275
LIQUID FILLED SHELLS
Dynamic response of fluid-filled shells
N75-29273
LIQUID PHASES
Vapour pressures and critical points of pure substances. 4: C1 to C20 alcohols
[ESDU-74023] N75-29197
Thermal conductivity of liquid n-alkyl aldehydes and ketones
[ESDU-71024] N75-29204
Thermal conductivity of liquid branched chain esters of monobasic alkanoic acids
[ESDU-71022] N75-29205
Thermal conductivity of liquid n-alkyl esters of monobasic n-alkanoic acids
[ESDU-71002] N75-29207
Thermal conductivity of liquid monobasic alkanoic acids
[ESDU-72007] N75-29208
Vapour pressures of pure substances up to their critical points. 1: C1 to C8 alkanes
[ESDU-72028] N75-29210
LIQUID ROCKET PROPELLANTS
Ramjet technology. Chapter 6: Ramjet fuels
[AD-A006114] N75-29124
LIQUID-LIQUID INTERFACES
Drop formation from single nozzles at high nozzle velocities in liquid-liquid systems
[BLL-RTS-9364] N75-29349
LITHIUM
Preliminary safety analysis of lithium batteries
[AD-A006149] N75-29569
LOAD DISTRIBUTION [FORCES]
The computation of aerodynamic loads on helicopter blades in forward flight, using the method of the acceleration potential
[VTH-189] N75-29055
LOAD TESTS
Behavior of four steel lightweight concrete composite beams under long lasting loads
[CRIF-MT-93] N75-29479
Load deflection behavior of lime stabilized layers
[AD-A006015] N75-29494
LOADING OPERATIONS
Automatic external load aquisition by helicopter
[AD-A005051] N75-29097
LOADS [FORCES]
A parachute opening shock theory based on nonlinear time histories of inflow velocity and projected area
[AD-A005271] N75-29057
Information on the use of data items on struts
[ESDU-01.01.00] N75-29464
On the question of static computation of saddle-shapped suspended coverings according to a discrete diagram
[AD-A005997] N75-29498
LOGISTICS MANAGEMENT
An evaluation of heuristic scheduling rules by using a zero-one linear programming approach
[AD-A006348] N75-29458
Computer assisted instructions in system reliability for logistics managers
[AD-A006340] N75-29461
An analysis of the effectiveness of ASPR in proving guidance for the utilization of government-owned industrial plant equipment
[AD-A006351] N75-29938
An investigation of a proposed auction technique as a method of procurement
[AD-A006350] N75-29939
LONG RANGE WEATHER FORECASTING
World climate and world food systems 4: A survey of the state of the art in meteorological long range statistical forecasting
[PB-240873/0] N75-29692
LONG WAVE RADIATION
The estimation of the service areas of medium and long-wave broadcasting stations
[BBC-RD-1975/1] N75-29281
LONGITUDINAL CONTROL
Longitudinal motions of aircraft involving high angles of attack
[ARC-R/M-3753] N75-29094
LONGITUDINAL STABILITY
The dynamic stability derivatives of a slender wing at zero and moderate life. A comparison of theory with free-flight model tests, Mach number equals 0.8 to 2.0
[ARC-CP-1310] N75-29048
Free-flight model dynamic stability measurements on a not-so-slender wing/fin combination at zero and small lift, Mach number equals 0.8 to 2.0
[ARC-CP-1315] N75-29051
LONGITUDINAL WAVES
Dispersion relation for electron waves propagating in an isotropic plasma containing Maxwellian and suprathermal electrons
N75-29881
LOOP ANTENNAS
Man-pack loop antenna system
[AD-A006278] N75-29326
LOUISIANA
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs — Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain
[E75-10382] N75-29524
LOW PRESSURE
Rapid structural changes in an asymmetrical tropical depression
N75-29661
LOW SPEED
Behavioural observations of passengers boarding a slow speed conveyor
[TT-7411] N75-29759
LOW TEMPERATURE PHYSICS
Thermodynamic analysis of direct low-temperature cycles
[BLL-RTS-9548] N75-29935
LOW THRUST PROPULSION
A numerical simulation for the spiral raising to the 24 hour orbit by a low-thrust space vehicle with Solar Electric Propulsion [SEP] system
[NAL-TR-395] N75-29177
LOWER ATMOSPHERE
How to build Gulliver's watch [biosphere model]
[NASA-TT-F-16455] N75-29606
LUBRICATING OILS
Operating limitations of high speed jet lubricated ball bearings
[NASA-TM-X-71678] N75-29429
Mechanical failure prognosis through oil debris monitoring
[AD-A006190] N75-29459
LUNAR RANGEFINDING
Accuracy of site coordinates obtainable by a mobile lunar laser station
[NASA-CR-143052] N75-29959
LUNAR ROCKS
Studies related to the surfaces of the moon and planets — a discussion of vapor deposition and glasses of lunar composition
[NASA-CR-143268] N75-29937
Chemical, mineralogical and textural systematics of non-mare melt rocks: Implications for lunar impact and volcanic processes
[NASA-CR-143285] N75-29974
LUNAR ROVING VEHICLES
Effect of yaw angle on steering forces for the lunar roving vehicle wheel
[NASA-CR-143290] N75-29976
LUNAR SURFACE
Preliminary research on body displacement during lunar walking
N75-29726

M

MACHINING
Bubble nucleation at real surfaces with no pre-existing gaseous phase
[OUEL-1110/74] N75-29279
MAGNESIUM OXIDES
Effect of magnesium oxide content on oxidation behavior of some superalloy-base cermets
[NASA-TM-X-3265] N75-29187
MAGNETIC ANNULAR ARC
THALIA: A one-dimensional magnetohydrodynamic stability program using the method of finite elements
[LRP-87/74] N75-29823
MAGNETIC ANOMALIES
A program to plot bathymetric and magnetic anomaly profiles
[AD-A006253] N75-29716
MAGNETIC DISKS
A new transient signal analysis unit — aerodynamic percussion analysis using magnetic disk unit
N75-29994
MAGNETIC DISTURBANCES
A laboratory solar flare neutral point experiment
[AD-A005821] N75-29984
MAGNETIC FIELD CONFIGURATIONS
Heating and containment of a plasma in a small Tokamak device
[REPT-74-87] N75-29549
An external ring system for magnetic plasma confinement
[TRITA-EPP-74-08] N75-29897
MAGNETIC FIELDS
A theoretical and experimental investigation of the magnetic fields and forces arising in magnetic suspension systems
[AD-A006109] N75-29443
Magnetic fluids: Magnetic forces and pumping mechanisms
[AD-A006323] N75-29867
MAGNETIC RIGIDITY
Tables of non-vertical cutoff rigidities for 76 various locations — geomagnetism, North America - Central America
[AD-A006397] N75-29973
MAGNETIC SUSPENSION
An evaluation of magnetic mounting of accelerometers
[AD-A005735] N75-29396
A theoretical and experimental investigation of the magnetic fields and forces arising in magnetic suspension systems
[AD-A006109] N75-29443
MAGNETOACOUSTIC WAVES
Experiments on magnetoacoustic resonances in a rotating plasma
[TRITA-EPP-74-24] N75-29898
MAGNETOHYDRODYNAMIC STABILITY
THALIA: A one-dimensional magnetohydrodynamic stability program using the method of finite elements
[LRP-87/74] N75-29823
HYMNIA: Band matrix package for solving eigenvalue problems
[LRP-90/75] N75-29824
Parametric instability of the sheath plasma resonance
[AD-A006489] N75-29901
MAGNETOHYDRODYNAMIC WAVES
Destabilization of hydromagnetic drift-Alfven waves in a finite pressure collisional plasma
[AD-A006223] N75-29904
MAGNETOHYDRODYNAMICS
Investigation of high power MHD gas lasers
[AD-A006298] N75-29420
Mechanisms of magnetoplasmadynamic arc jet acceleration processes
[AD-A006234] N75-29903
MAGNETOMETERS
Coupling considerations for squid devices
[AD-A006324] N75-29345
Calculations for interpretation of solar vector magnetograph data — sunspots - spectrum analysis/data correlation
[NASA-CR-120685] N75-29986
MAGNETOPAUSE
A mechanism for driving the gross Birkeland current configuration in the auroral oval — energy dissipation - plasma sheaths/geomagnetic tail
[TRITA-EPP-74-25] N75-29607
Magnetic merging in a collisionless plasma
[AD-A006408] N75-29905
MAGNETOSPHERE
A study of energetic particle precipitation effects associated with discrete VLF signals, and of the mechanism of VLF emission generation — electromagnetic radiation - magnetosphere
[AD-A006464] N75-29620
Magnetic merging in a collisionless plasma
[AD-A006408] N75-29905
A laboratory solar flare neutral point experiment
[AD-A005821] N75-29984
MAGNETS
High-energy beams and magnetic spectrometers
[ISS-L-74/8] N75-29861
MAGNIFICATION
Electronic magnification for astronomical camera tubes
[NASA-CR-143827] N75-29961
MAINE
The use of LANDSAT DCS and imagery in reservoir management and operation — Saint John River, Maine and Canada
[E75-10378] N75-29520
MAINTAINABILITY
Cost estimating relationships for predicting life cycle costs of inertial measurement unit maintenance
[AD-A006344] N75-29457
MAINTENANCE
A leading edge heating array and a flat surface heating array - operation, maintenance and repair manual
[NASA-CR-144357] N75-29088
Evaluating maintenance performance test administrator's manual and text subject's instructions for criterion referenced job task performance tests for electronic maintenance
[AD-A005785] N75-29768
Developments in computer aided software maintenance
[AD-A005827] N75-29805
MAN MACHINE SYSTEMS
Some preliminary experiments in the use of a programmable videotape recorder as an automated history-taking device in a chest clinic
[NPL-COM-73] N75-29745
Man as a precious resource: The enhancement of human effectiveness in flight operations
[AD-A006353] N75-29766
MANAGEMENT PLANNING
Advanced air traffic management system study: Technical summary
[PB-241223/7] N75-29086

Organization and planning of telecommunications enterprises
[JPRS-65331] N75-29295

MANGANESE
Removal of manganese from mine drainage by ozone and chlorine
[PB-241143/7] N75-29541

MANIPULATORS
Automatic external load aquisition by helicopter
[AD-A005051] N75-29097
Combined docking and grasping device
[NASA-CASE-MFS-23088-1] N75-29160
Concept design of the payload handling manipulator system --- space shuttle orbiters
[NASA-TM-X-72447] N75-29773
Robot manipulators --- in space exploration
[NASA-TT-F-16482] N75-29780

MANNED SPACE FLIGHT
Stellar diary
[NASA-TT-F-16376] N75-29142

MANUAL CONTROL
G-load measuring and indicator apparatus
[NASA-CASE-ARC-10806-1] N75-29381
Designing a manual cost data base
[AD-A006508] N75-29948

MANUALS
A leading edge heating array and a flat surface heating array - operation, maintenance and repair manual
[NASA-CR-144357] N75-29088

MANY BODY PROBLEM
Computer simulation of plasma and N-body problems
[NASA-CR-143286] N75-29894

MAPPING
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525
ACS batch processing system. Volume 1: System design document
[AD-A005304] N75-29537
ACS batch processing system. Volume 2: User's guide
[AD-A005305] N75-29538
ACS batch processing system. Volume 3: System and functional program description
[AD-A005306] N75-29539

MARAGING STEELS
The feasibility of ranking material fracture toughness by ultrasonic attenuation measurements
[NASA-TM-X-71769] N75-29241

MARINE ENVIRONMENTS
Report to the Congress on ocean pollution, overfishing, and offshore development; July 1973 through June 1974
[COM-75-10509/8] N75-29593
Federal plan for environmental data buoys
[COM-75-10511/4] N75-29699
Marine physics: Internal-surface wave interaction and microstructure measurement program
[AD-A005828] N75-29707

MARINE METEOROLOGY
Spatial and temporal variations of the turbulent fluxes of heat, momentum, and water vapor over Lake Ontario during IFYCL
[COM-75-10481/0] N75-29700

MARINE PROPULSION
Superconducting windings --- for marine electric propulsion
[AD-A006476] N75-29337

MARINE RESOURCES
Legal aspects of phosphate mining in North Carolina
[COM-75-10504/9] N75-29540

MARITIME SATELLITES
Design, manufacture and test of an electrical model of a shaped beam antenna for a maritime satellite
[ESRO-CR(P)-644] N75-29303

MARKOV CHAINS
Some remarks on the construction of independent identically distributed random variables and Markov chains
[RR-160/DNS/MBR/2] N75-29842

MARS SURFACE
Automated Mars surface sample return mission concepts for achievement of essential scientific objectives
[NASA-TM-X-3184] N75-29156
Evaluation of the present theoretical basis for determination of planetary surface properties by earth-based radar
[NASA-TN-D-7889] N75-29965

MARSHLANDS
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525

MASS SPECTRA
Computer analysis of the mass spectra of gas mixtures
[AD-A006160] N75-29221

MASS SPECTROSCOPY
Chemical flame inhibition using molecular beam mass spectrometry. Computational methods for analyzing flame microstructure
[PB-241245/0] N75-29219

MATERIAL ABSORPTION
Monte Carlo variance reduction study --- radiation effects - material absorption/nuclear radiation
[NASA-CR-120672] N75-29818

MATERIALS
Wear and interfacial transport of material
[NASA-TM-X-71781] N75-29909

MATERIALS RECOVERY
Extracting minerals from geothermal brines: A literature study
[PB-240681/7] N75-29545
A computer program for evaluation of solid waste resource recovery
[AD-A006356] N75-29583

MATHEMATICAL MODELS
Study to develop regional and nation-wide estimates of General Aviation [GA] activity at non-towered airports
[AD-A009883] N75-29062
Satellite operations model extension --- COS-B closed loop model
[ESS/SS-617] N75-29146
Mathematical modelling of the RAE lightweight flexible solar array
[RAE-TR-74112] N75-29157
The characteristics of self sustained particulate boron combustion in air at ambient pressure
[AD-A006039] N75-29233
Analysis of dynamic capacity of low-contact-ratio spur gears using Lundberg-Palmgren theory
[NASA-TN-D-8029] N75-29434
Mean gravity anomaly prediction from terrestrial gravity data and satellite altimeter data
[AD-A006363] N75-29619
An investigation of interactions between double clouds using a two dimensional numerical model
[AD-A006255] N75-29703
A bibliography of numerical models for tidal rivers, estuaries and coastal waters
[COM-75-10477/8] N75-29712
CARMONETTE. Volume 1. General description --- ground combat simulation, target acquisition, and mathematical models
[AD-A007843] N75-29806
The MCL-Thurow model supplement
[PB-241113/0] N75-29952
Adjustment of mean earth ellipsoid parameters --- geodesy - mathematical models
[AD-A006364] N75-29972
Development of solar wind shock models with tensor plasma pressure for data analysis
[NASA-CR-143301] N75-29978

MATRICES [MATHEMATICS]
Primal geometric programs treated by linear programming
[AD-A005902] N75-29801
V-positivity, poverses and an economic global unicity theorem of Gale and Nikaido
[AD-A005901] N75-29802
An analysis of Lanczos algorithms for symmetric matrices
[AD-A006361] N75-29835
Computation of functions of triangular matrices
[AD-A005916] N75-29838
Transfer matrices of hydraulic systems. Theoretical and experimental study --- propellant transfer noting pogo effect
N75-29990

MATRIX METHODS
An incore finite element program for research and teaching purposes --- matrix displacement method
[ISD-162] N75-29486

MATRIX THEORY
THALIA: A one-dimensional magnetohydrodynamic stability program using the method of finite elements
[LRP-87/74] N75-29823
HYMNIA: Band matrix package for solving eigenvalue problems
[LRP-90/75] N75-29824

MEASURING INSTRUMENTS
Wind tunnel model deformation measuring system
[AD-A006390] N75-29138
Thrust measurement
[NASA-CASE-XMS-05731] N75-29382
Method and apparatus for background signal reduction in opto-acoustic absorption measurement
[NASA-CASE-NPO-13683-1] N75-29383

MECHANICAL DRIVES
Thermal vacuum acceptance test of no. 2 Hawker Siddeley dynamics low speed mechanism --- solar paddle drive mechanism
[ESRO-ESTL-10] N75-29095
Features of using reversing thyristor excitors with separate control in electric drive systems
[AD-A006088] N75-29332
Thermal vacuum qualification test of no. 1 Marconi Space and Defence Systems low speed mechanisms --- for geostationary satellite solar paddle
[ESRO-ESTL-11] N75-29451

MECHANICAL PROPERTIES
Polydichlorophosphazene: Thermomechanical behavior
[AD-A005911] N75-29265
Experimental test of the load bearing capacity of smooth glass fibre reinforced plastic hollow cylinders subjected to external hydrostatic pressure
[BLL-NEL-TT-2564-[6075.461]] N75-29463

MECHANICAL SHOCK
The Shock and Vibration Digest, Volume 7, No. 5 May 1975
[AD-A010036/2] N75-29271

MEDICAL PERSONNEL
A study on medical officer career management and retention in the USA armed forces
N75-29729

MELTING POINTS
Normal melting points, boiling points and critical points of n-alkyl esters of monobasic n-alkanoic acids
[ESDU-71001] N75-29203
Normal melting points, boiling points and critical points of n-alkyl aldehydes and ketones
[ESDU-71023] N75-29206
Normal melting points, boiling points and critical points of monobasic alkanoic acids
[ESDU-72006] N75-29209

MERCURY [METAL]
Experimental investigation of beams exhausted from a 5cm mercury electronbombardment ion engine
[NAL-TR-398] N75-29176

METAL COATINGS
The chemical deposition of dispersion coatings with Ni-P and Ni-B matrices. Embedding of oxides: Titanium dioxide
[BLL-LTI-746-01460-[9022.401]] N75-29235
Investigate material systems for a mirrors used in high power CO and CO2 lasers
[AD-A006101] N75-29414

METAL FATIGUE
Fatigue strength of the titanium alloys Ti 8Al 1Mo 1V, Ti 5Al 2.5Sn and Ti 6Al 4V at high temperatures --- 246 C and 340 C
[ISD-161] N75-29251

METAL FIBERS
Normal incidence absorption coefficients and acoustic impedances of typical single layer fibrous lining materials --- fibermetals and polyimide laminates
[ESDU-74003] N75-29185

METAL FILMS
Direct observation of small cluster mobility and ripening --- during annealing of metal films on amorphous substrates
[NASA-TM-X-62456] N75-29915

METAL MATRIX COMPOSITES
Aerospace Research. Bi-monthly Bulletin No. 1974-1 --- influence of combustion and hydraulic systems on pogo effects, combustion stability in swirling flow, metal matrix composite materials
[ESRO-TT-144] N75-29988
Processing composite materials with a metallic matrix --- aluminum between nickel coated carbon fibers
N75-29992

METAL POWDER
Forged metal powder gears --- for automobiles
[AD-A005787] N75-29441
Center for high energy forming
[AD-A006259] N75-29446

METAL SHEETS
Fatigue crack propagation data for titanium sheet alloys: IMI 318
[NLR-TR-74048-U] N75-29252

METEOROLOGICAL BALLOONS
Balloon sounding of the atmosphere
[NASA-TT-F-16380] N75-29635

METEOROLOGICAL CHARTS
Meteorological data. Volume 141, no. 9: Results of synoptic services in 1974. Daily and monthly weather maps [surface, 850 millibars, 500 millibars], tables and brief scientific articles, September
N75-29628
Meteorological data. Volume 138, no. 2: Daily altitude charts of the 30 millibar level and mean monthly charts for 1973. Parts 3 and 4, 3rd and 4th. Quarters stratosphere working group
N75-29629
Meteorological data. Volume 145, no. 2: The European climatology for 1974. Meteorological satellite data from the Berlin zone of reception part 2, 2nd quarter
N75-29630

METEOROLOGICAL PARAMETERS
Program description. The ARPA/RML atmospheric sciences program
[AD-A006044] N75-29060
A GASP 4 simulation of tactical air interdiction using a choice of weapons loads and continuously changing weather conditions
[AD-A006349] N75-29417
An intercomparison of radiosonde and satellite-derived cross sections during the AMTEX
[COM-75-10439/8] N75-29616
Determination of certain parameters of clouds with the aid of a laser locator
[BLL-M-23632-[5828.4F]] N75-29627

Airborne meteorological instrumentation system and data reduction
[AD-A009665] N75-29636
An analysis of the surface layer meteorological parameters measurements on equator --- time series analysis
N75-29643
Diurnal and semidiurnal variations by meteorological measurements on equator
N75-29644
On characteristic time scales of meteorological fields in the tropical Atlantic zone
N75-29645
On the orders of the values of the meteorological elements obtained in the A/B array in the period of GATE
N75-29650
On a principle of validation of the meteorological observation results in GATE-74
N75-29651
On the structure of the cumulus clouds at the equator in connection with meteorological conditions according to the stereophotographic measurements on board the R/V Akademik Kurchatov
N75-29656
Summary of synoptic meteorological observations for Great Lakes areas. Volume 2: Lake Huron and Georgian Bay
[COM-75-10364/8] N75-29694
Summary of synoptic meteorological observations for Great Lakes areas. Volume 3: Lake Michigan
[COM-75-10365/5] N75-29695
Summary of synoptic meteorological observations for Great Lakes areas. Volume 4: Lake Superior
[COM-75-10366/3] N75-29696

METEOROLOGICAL SATELLITES
Meteorological data. Volume 145, no. 2: The European climatology for 1974. Meteorological satellite data from the Berlin zone of reception part 2, 2nd quarter
N75-29630
Study of meteorological data processing methods
[ESRO-SP-85] N75-29689

METHANE
Effect of gravity on methane-air combustion --- computer programs
[NASA-CR-143350] N75-29211
Experimental and flight evaluation of the titanium tetrachloride water methanol system for the production of smoke trails
[AD-A006126] N75-29702

METHYL COMPOUNDS
Investigations on the behavior of excited methyl-fluoride molecules in proximity of atoms
[REPT-8/1974] N75-29872

METROLOGY
The impact of metrication on the Defense standardization program
[AD-A006038] N75-29280

MICE
Research on biological effects of VLF band electromagnetic radiation
[AD-A006388] N75-29753

MICHIGAN
Investigation of Skylab data --- Locke Township, Ingham County, Michigan
[E75-10363] N75-29505
Recognition map analysis and crop acreage estimation using Skylab EREP data --- Michigan
[E75-10366] N75-29508
Recognition map analysis and crop acreage estimation using Skylab EREP data --- Michigan
[E75-10369] N75-29511

MICROELECTRONICS
Semiconductor microelectronics --- integrated circuits
[AD-A006074] N75-29928

MICROORGANISMS
Chemical controls for sterilization in autoclaves --- heat resistance indication for microorganisms
[NASA-TT-F-16478] N75-29718
Chemical controls for dry heat sterilization
[NASA-TT-F-16321] N75-29719
In-situ separator --- for microorganisms
[AD-A006274] N75-29734

MICROPROGRAMMING
Use of a microprocessor in a supervisory control application
[AD-A006119] N75-29791

MICROSTRUCTURE
Chemical flame inhibition using molecular beam mass spectrometry. Computational methods for analyzing flame microstructure
[PB-241245/0] N75-29219
On microstructure of clouds in the eastern zone of the Atlantic
N75-29654
Radar investigations of evolution of clouds in the eastern Atlantic
N75-29658
Case study of the physical structure of individual cumulo nimbus [mission 226-4, type 8B2]
N75-29663
Microphysical characteristics of local fogs
[AD-A006075] N75-29697

MICROWAVE EQUIPMENT
Broadband ferrite limiters --- microwave equipment
[AD-A005279] N75-29328
Microwave acoustics handbook. Volume 2: Surface wave velocities, numerical data
[AD-A006113] N75-29870

MICROWAVE LANDING SYSTEMS
Refinement and validation of two digital Microwave Landing System [MLS] theoretical models
[NASA-CR-132713] N75-29066

MICROWAVE RADIOMETERS
A feasibility study of a microwave water vapor measurement from a space probe along an occultation path
[NASA-CR-143266] N75-29603

MICROWAVE TRANSMISSION
Rain attenuation studies
[AD-A006123] N75-29310

MIDAIR COLLISIONS
Civil aviation midair collisions analysis: 1972 added to 1964 - 1971 results --- statistical analysis
[AD-A005897] N75-29064

MIGRATION
Utilization of Skylab [EREP] system for appraising changes in continental migratory bird habitat
[E75-10361] N75-29503

MILITARY AIR FACILITIES
TACAN and ILS station evaluation report, Loring AFB, Maine
[AD-A006416] N75-29084

MILITARY AIRCRAFT
Aeronautics in the American Society
N75-29002
The next forty years in aviation
N75-29007
Optimization of the time between aircraft overhauls by minimizing maintenance cost
[AD-A006505] N75-29100
AFBITS experimental equipment evaluations
[AD-A006192] N75-29309
A GASP 4 simulation of tactical air interdiction using a choice of weapons loads and continuously changing weather conditions
[AD-A006349] N75-29417
Desert storage test program
[AD-A006103] N75-29454
USAF aircraft pollution emission factors and landing and takeoff LTO cycles
[AD-A006239] N75-29582
Training of enlisted women as jet aircraft maintenance specialists
[AD-A006434] N75-29771

MILITARY AVIATION
A study to determine the adequacy of the tools and equipment used by Air Force women in the craft skills
[AD-A006342] N75-29767

MILITARY HELICOPTERS
Fatigue damage equivalence of field and simulated vibrational environments
[AD-A006226] N75-29453

MILITARY OPERATIONS
Alternative strategies for optimizing energy supply, distribution, and consumption systems on Naval bases. Volume 3: Assessment of total energy system applications at Naval facilities
[AD-A003590] N75-29550
Statistics in human engineering --- military flying personnel
[RAE-TR-74166] N75-29782

MILITARY VEHICLES
Fatigue damage equivalence of field and simulated vibrational environments
[AD-A006226] N75-29453

MILLIMETER WAVES
ATS-6 millimeter wavelength propagation experiment
[NASA-CR-143832] N75-29290
Electronically steerable millimeter wave antenna techniques for space shuttle applications
[NASA-CR-143813] N75-29291
Atmospheric measurements at millimeter wavelengths
[AD-A006128] N75-29626
ATS-6 millimeter wavelength propagation experiment --- a data acquisition system
[NASA-CR-143829] N75-29944

MINERAL DEPOSITS
Extracting minerals from geothermal brines: A literature study
[PB-240681/7] N75-29545

MINES [EXCAVATIONS]
Analysis of fires caused by short circuits in cable networks in mines in the Ukrainian SSR
[AD-A006002] N75-29336
Numerical simulation of flame induced aerodynamics in a coal-mine passageway, semi-empirical model
[PB-240843/3] N75-29379
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
Removal of manganese from mine drainage by ozone and chlorine
[PB-241143/7] N75-29541
Improved mine rescue breathing apparatus
[PB-241105/6] N75-29787

MINICOMPUTERS
A TUTOR minicomputer system
[AD-A005782] N75-29790
Remote-terminal emulator [design verification model]: User's Manual
[AD-A006193] N75-29804
Implementation of a mini-computer based information system. Part 18. A general file dump program for the Varian 620 computer --- for debugging and detection of machine failures
[AD-A008519] N75-29945

MINNESOTA
Characterization of vessel wastes in Duluth-Superior Harbor
[PB-241081/9] N75-29585

MIRRORS
Investigate material systems for a mirrors used in high power CO and CO2 lasers
[AD-A006101] N75-29414
Large diameter active mirror with holographic figure sensing --- thin mirror active system
[AD-A006211] N75-29892

MIS [SEMICONDUCTORS]
Study of infrared solid state images using charge transport devices
[AD-A005736] N75-29925

MISSION PLANNING
Premission and postmission simulation studies of the foot-controlled maneuvering unit for Skylab experiment T-020 --- astronaut maneuvering equipment - space environment simulation
[NASA-TN-D-7963] N75-29153
Automated Mars surface sample return mission concepts for achievement of essential scientific objectives
[NASA-TM-X-3184] N75-29156
Mission roles for the solar electric propulsion stage with the space transportation system
[NASA-CR-120664] N75-29170

MISSISSIPPI
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514

MIXING
The disturbance of the mixing region of two planar jets by means of a shock wave
[NASA-TT-F-16507] N75-29358

MODELS
Design of a 9 inch cycloidal propeller model unit and some experimental results
[AD-A005768] N75-29442

MODULATORS
Low-level modulator and isolator-limiter-detector development --- for use at ultrahigh frequencies
[AD-A006296] N75-29308

MOISTURE METERS
A feasibility study of a microwave water vapor measurement from a space probe along an occultation path
[NASA-CR-143266] N75-29603

MOLECULAR BEAMS
Chemical flame inhibition using molecular beam mass spectrometry. Computational methods for analyzing flame microstructure
[PB-241245/0] N75-29219
Experimental studies of the collisional excitation of infrared active vibrational stretch modes in CO2 and H2O with an intersecting, hyperthermal molecular beam apparatus, volume I
[AD-A006237] N75-29886

MOLECULAR EXCITATION
The electron energy loss rates by polar molecules
[ISAS-530-VOL-40-NO-10] N75-29871
Investigations on the behavior of excited methyl-fluoride molecules in proximity of atoms
[REPT-8/1974] N75-29872

MOLECULAR RELAXATION
Relaxation behind strong shock waves
[AD-A005765] N75-29373

MOLECULAR ROTATION
The electron energy loss rates by polar molecules
[ISAS-530-VOL-40-NO-10] N75-29871

MOLECULAR STRUCTURE
Molecular dynamics calculators at Orsay --- a discussion of molecular structure, ionic crystals, and lattice vibrations
[AD-A006027] N75-29924

MOLECULAR WEIGHT
The gas density balance and the mass chromatograph
[AD-A006481] N75-29226

MOLYBDENUM COMPOUNDS
Hot corrosion in burner gas at 1200 C
[NASA-TT-F-16509] N75-29245

MONATOMIC GASES
The measurement of the thermal slip of gases
[NASA-TT-F-16476] N75-29352

MONOPULSE RADAR
The estimation of the direction of radar targets
[PHL-1975-01] N75-29324

MONSOONS
Cloud cluster formation over monsoon Africa
N75-29649

MONTANA
Aerial spray evaluation pine butterfly test, Bitterroot National Forest, Montana, 1973
[AD-A006256] N75-29401

Investigation of relationships between linears, tonal and hazy anomalies, and petroleum production in the Williston Basin: An ERTS approach
[E75-10370] N75-29512
A regional land use survey based on remote sensing and other data — Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona
[E75-10374] N75-29516
Investigation of relationships between linears, total and hazy areas, and petroleum production in the Williston Basin: An ERTS approach
[E75-10384] N75-29526

MONTE CARLO METHOD
Monte Carlo variance reduction study — radiation effects - material absorption/nuclear radiation
[NASA-CR-120672] N75-29818
The Monte Carlo method of evaluating integrals
[AD-A005891] N75-29837
Solution of problems in physical and chemical kinetics by the Monte Carlo method
[AD-A006083] N75-29874

MOUNTAINS
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525

MOUNTING
An evaluation of magnetic mounting of accelerometers
[AD-A005735] N75-29396

MOUTH
Study to define and verify the personal oral hygiene requirements for extended manned space flight: Oral physiology and microbiology in Skylab manned space missions
[NASA-CR-144361] N75-29740

MOVING TARGET INDICATORS
Improved MTI radar signal processor
[AD-A010478] N75-29075
Comparison of some classes of MTI filters for a 3-pulse canceller with staggered PRF
[PHL-1974-38] N75-29323

MULTIPLE BEAM INTERVAL SCANNERS
Some characteristics of a communication satellite multiple-beam antenna
[AD-A006405] N75-29311

MULTIPOLAR FIELDS
Stabilization of kink disturbances by inhomogeneous magnetic fields
[TRITA-EPP-75-01] N75-29899

MULTISPECTRAL BAND SCANNERS
Breadboard linear array scan imager program
[NASA-CR-143828] N75-29887

MULTISPECTRAL PHOTOGRAPHY
A study to analyze six band multispectral images and fabricate a Fourier transform detector — optical data processing - aerial photography/forests
[NASA-CR-120684] N75-29388
Interpolation of ERTS-1 multispectral scanner data
[NASA-CR-141861] N75-29530

MULTIVARIATE STATISTICAL ANALYSIS
Some contributions to multivariate nonparametric methods
[AD-A006154] N75-29832

N

NACELLES
The effect of a pylon-mounted nacelle on the flutter behaviour of a wing-pylon-nacelle configuration
[NLR-TR-74125-U] N75-29056
Conceptual design study of advanced acoustic-composite nacelles
[NASA-CR-132703] N75-29093

NASA PROGRAMS
Jupiter orbiter. Study of critical aspects of a joint ESA/NASA project — based on Pioneer H for Jupiter atmosphere mapping
[MBB-UR-V-77-74] N75-29975

NATURAL GAS
Rio Blanco massive hydraulic fracturing demonstration
[PB-240849/0] N75-29614

NAVIER-STOKES EQUATION
Computational aerodynamics
N75-29013
Numerical computation of three-dimensional blunt body flow fields with an impinging shock
[NASA-CR-143312] N75-29038

NAVIGATION AIDS
Evaluation of a very low frequency navigation system
[AD-A005043] N75-29074

NAVY
Newest methods of air distribution in conditioning systems on naval transport vessels
[NASA-TT-F-16498] N75-29775
Status and prospects for the development of air conditioning for naval vessels
[NASA-TT-F-16457] N75-29777

NEAR FIELDS
The accuracy of far-field noise obtained by the mathematical extrapolation of near-field noise data
[NASA-TM-X-62434] N75-29067

NECK [ANATOMY]
Basic biomechanical properties of the human neck related to lateral hyperflexion injury
[PB-241246/8] N75-29747
Head and neck mobility of pilots measured at the eye
[RAE-TR-74158] N75-29781

NEODYMIUM
Analysis of the ground term energy levels for triply ionized neodymium in yttrium orthovanadate
[AD-A006017] N75-29873

NETHERLANDS
Visibility on the Atlantic Ocean and the North Sea
[PHL-1974-32] N75-29688

NETWORK ANALYSIS
A study of bifurcated routing in a data network and the effect of isarithmic flow control in this context
[NPL-COM-72] N75-29305
Efficiency of a phased array antenna as a function of phase shifter loss and mismatch due to mutual coupling
[PHL-1974-31] N75-29321

NETWORKS
GOSPRE: A simple analytical program for computing grade of service in a heavily loaded communications network
[SRDE-74018] N75-29301
Seismic discrimination
[AD-A006194] N75-29624

NEUTRON BEAMS
ESTOQ: A program for calculation of primary shock sources for avoidance of ray-effects with two dimensional S sub N calculations
[REPT-4-17] N75-29363

NEW MEXICO
A regional land use survey based on remote sensing and other data — Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona
[E75-10374] N75-29516

NEWTON-RAPHSON METHOD
The incremental solution of some basic problems in elastic stability — using Newton-Raphson method and nonlinear equations
[NLR-TR-74005-U] N75-29490

NICKEL
Thermodynamics and kinetics of reactions in protective coating systems
[NASA-CR-143313] N75-29249
Effects of environment on the mechanical behavior of metals — prevention of stress corrosion cracking and hydrogen embrittlement
[AD-A006299] N75-29260
Evaluation of proposed electroplated HGU-4/P frames — to determine the incidence of resulting nickel dermatitis
[AD-A006121] N75-29749

NICKEL ALLOYS
Method of heat treating age-hardenable alloys
[NASA-CASE-XNP-01311] N75-29236
Directionally solidified pseudo-binary eutectics of Ni-Cr-[Hf, Zr]
[NASA-TM-X-71765] N75-29243
Study of zirconium-niobium-nickel system by local X-ray analysis
[NASA-TT-F-16474] N75-29246
Determination of structural engineering properties of incoloy 903 and CTX-1 alloys
[NASA-CR-120673] N75-29247
New machinery and materials — a discussion of reinforcing fibers, whisker composites, nickel alloys, and laser applications
[AD-A005953] N75-29438

NICKEL CADMIUM BATTERIES
Evaluation of Ni-Cd cell covers. Results of testing of covers with protected brazing fillet
[NLR-TR-75033-C] N75-29452

NICKEL COATINGS
Processing composite materials with a metallic matrix — aluminum between nickel coated carbon fibers
N75-29992

NICKEL PLATE
Developments in convective heat transfer models featuring seamless and selected detail surfaces, employing electroless plating
[NASA-CR-144364] N75-29356

NIOBIUM ALLOYS
Study of zirconium-niobium-nickel system by local X-ray analysis
[NASA-TT-F-16474] N75-29246

NITRATE ESTERS
Improvement of the acceptance and surveillance control of nitrate ester propellants. Part 3: Comparative investigation of stability tests for nitrate ester propellants
[TL-1974-20-PT-3] N75-29267

NITRIDES
Reaction between refractory metals and insulating nitrides at high temperatures
[NASA-TT-F-16477] N75-29239

NITRIDING
Material evaluation program, high-temperature nitriding environment
[NASA-CR-144382] N75-29216

NITROGEN COMPOUNDS
Thermal conductivity of liquid aromatic compounds containing nitrogen
[ESDU-74034] N75-29195

NITROGEN OXIDES
Parametric investigation of the Na-N2O + CO chemical laser
[AD-A006117] N75-29415
The control of nitrogen oxide emission from stationary sources
[BLL-RTS-9849] N75-29571

NOAA 3 SATELLITE
A comparison of infrared imagery and video pictures in the estimation of daily rainfall from satellite data
[COM-75-10435/6] N75-29698

NOISE [SOUND]
The effect of quiet on hearing — psychoacoustics - noise [sound]
[AD-A006395] N75-29748

NOISE MEASUREMENT
Baseline measurement of the noise generated by a short-to-medium range jet transport flying standard ILS approaches and level flyovers
[NASA-TM-X-72760] N75-29119

NOISE POLLUTION
Annoyance resulting from intrusion of aircraft sounds upon various activities
[NGR-43-008-008] N75-29112

NOISE REDUCTION
Trends in aircraft noise control
N75-29008
Reliable line signaling techniques for the FAA GRN-27[V] and CAT-3 ILS
[AD-A009881] N75-29077
Conceptual design study of advanced acoustic-composite nacelles
[NASA-CR-132703] N75-29093
Noise suppression with high Mach number inlets
[NASA-CR-143314] N75-29115
Engineering simulation evaluation of the two-segment noise abatement approach in the Douglas DC-8-61
[NASA-CR-137665] N75-29121
Experimentally determined aeroacoustic performance and control of several sonic inlets
[NASA-TM-X-71767] N75-29353
Solar 10 kW turboalternator silent power program
[AD-A006549] N75-29535

NOISE TOLERANCE
Establishing certification/design criteria for advanced supersonic aircraft utilizing acceptance, interference, and annoyance response to simulated sonic booms by persons in their homes
[AD-A009656] N75-29090

NONDESTRUCTIVE TESTS
Solid rocket motor inspection by acoustical holography techniques
[AD-A006236] N75-29179
An application of holographic interferometry to gun barrel erosion
[AD-A005867] N75-29400

NONLINEAR EQUATIONS
The incremental solution of some basic problems in elastic stability — using Newton-Raphson method and nonlinear equations
[NLR-TR-74005-U] N75-29490
Optimal linear and nonlinear feature extraction based on the minimization of the increased risk of misclassification — Bayes theorem - statistical analysis/data processing
[NASA-CR-144385] N75-29821

NONLINEAR SYSTEMS
Complete identification of a class of nonlinear systems from steady state frequency response
[AD-A005829] N75-29814

NONPARAMETRIC STATISTICS
Some contributions to multivariate nonparametric methods
[AD-A006154] N75-29832

NONUNIFORM MAGNETIC FIELDS
Stabilization of kink disturbances by inhomogeneous magnetic fields
[TRITA-EPP-75-01] N75-29899

NORMAL DENSITY FUNCTIONS
A development and analysis of multiple range techniques for controlling the variability of a process characteristic with a uniform distribution
[AD-A006478] N75-29456

NORTH AMERICA
Tables of non-vertical cutoff rigidities for 76 various locations — geomagnetism, North America - Central America
[AD-A006397] N75-29973

NORTH DAKOTA
Investigation of relationships between linears, total and hazy areas, and petroleum production in the Williston Basin: An ERTS approach
[E75-10384] N75-29526

Model studies of drifting snow patterns at safeguard facilities in North Dakota
[AD-A006018] N75-29701

NORTH SEA
Visibility on the Atlantic Ocean and the North Sea
[PHL-1974-32] N75-29688

NORTHERN HEMISPHERE
Metorological data. Volume 141, no. 9: Results of synoptic services in 1974. Daily and monthly weather maps [surface, 850 millibars, 500 millibars], tables and brief scientific articles, September
N75-29628

Meteorological data. Volume 138, no. 2: Daily altitude charts of the 30 millibar level and mean monthly charts for 1973. Parts 3 and 4, 3rd and 4th. Quarters stratosphere working group
N75-29629

Solar activity and precipitation within the zones of latitude 0 deg - 40 deg N
N75-29637

NOTCH TESTS
The effects of notches of high Kt on the fatigue behaviour of 7178-T6 aluminium alloy
[ARL/SM-354] N75-29244

The application of fracture mechanics to the prediction of the fatigue life of sharply notched components
[BLL-CE-TRAN-6544-[9022.09]]
N75-29470

The effect of mean stress on the fatigue of aluminum alloys --- notched specimens
[S/T-MEMO-9/74] N75-29482

Flight-Simulation tests on notched elements --- fatigue and crack initiation
[NLR-TR-74033-U] N75-29488

NOZZLE DESIGN
An improved numerical procedure for the parametric optimization of three dimensional scramjet nozzles --- supersonic combustion ramjet engines - computer programs
[NASA-CR-132695] N75-29359

NOZZLE FLOW
Technical evaluation report on fluid dynamics panel symposium on Airframe/Propulsion --- a discussion of air intakes, nozzle flow, and flow distribution
[AGARD-AR-81] N75-29114

Drop formation from single nozzles at high nozzle velocities in liquid-liquid systems
[BLL-RTS-9364] N75-29349

NUCLEAR EMULSIONS
Width measurements on short tracks of cosmic ray nuclei in nuclear emulsion
[LUIP-CR-74-13] N75-29987

NUCLEAR MODELS
On construction of the closed theory of spinning detonation
[AD-A005993/1] N75-29224

NUCLEAR POWER PLANTS
Safety evaluation of the Washington public power supply system, nuclear projects 1 and 4. Dockets 50-460 and 50-513
[PB-241266/6] N75-29882

Safety evaluation report of Joseph M. Farely nuclear plant, units 1 and 2
[PB-241108/0] N75-29883

Environmental survey of transportation of radioactive materials to and from nuclear power plants, supplement 1
[PB-241065/2] N75-29956

NUCLEAR RADIATION
Monte Carlo variance reduction study --- radiation effects - material absorption/nuclear radiation
[NASA-CR-120672] N75-29818

NUCLEAR SPIN
On construction of the closed theory of spinning detonation
[AD-A005993/1] N75-29224

NUCLEAR STRUCTURE
Nuclear structure research --- discussion of heavy ions, rare earth elements, and energy levels
N75-29875

Stripping to unbound states --- on targets of beryllium, carbon, and oxygen isotopes
N75-29877

Spectroscopy in the sd and fp shells --- gamma ray spectroscopy
N75-29878

Energy measurements
N75-29879

Spectroscopy in the rare earth region
N75-29880

NUCLEATE BOILING
Bubble nucleation at real surfaces with no pre-existing gaseous phase
[OUEL-1110/74] N75-29279

NUCLEATION
Bubble nucleation at real surfaces with no pre-existing gaseous phase
[OUEL-1110/74] N75-29279

NUMERICAL ANALYSIS
Computational aerodynamics
N75-29013

NUMERICAL CONTROL
Numerical techniques for electromagnetic scattering
[AD-A006459] N75-29312

NUMERICAL INTEGRATION
Numerical integration of the momentum-integral equations and application of the results to the flow between rotating disks
[VTH-183] N75-29369

NUTATION
Interactions between SAS-C spacecraft nutations and spin-rate control system
[AD-A006115] N75-29152

O

OCEAN BOTTOM
Taking cores from unconsolidated sediments of the shelf area using a vibration-hammer corer
[BLL-M-23679-[5828.4F]] N75-29705

Catalogue of geoidal variations for simple seafloor topographic features
[NASA-CR-141400] N75-29706

OCEAN CURRENTS
Fluctuations in the vertical structure of the Atlantic equatorial undercurrent
N75-29675

On the reality of existence of sporadic large-scale eddy formations in the ocean
N75-29676

Ocean currents observed by NOAA ship Oceanographer during GATE
N75-29677

Main statistical characteristics of currents in the northern part of B-scale
N75-29678

Variations of temperature, salinity and currents in the mixed layer and the thermocline [preliminary results]
N75-29681

The experiment of investigation of the dynamics of the upper ocean layer at the Equator
N75-29683

Ship drift components: Means and standard deviations
[AD-A006470] N75-29708

Cable strumming experiments
[AD-A005894] N75-29715

OCEAN SURFACE
Preliminary scientific results of the GARP Atlantic tropical experiment, volume 2
[GATE-14-VOL-2] N75-29639

Diurnal and semidiurnal variations by meteorological measurements on equator
N75-29644

The cool skin of the ocean --- temperature differences between ocean surface and few cm below
N75-29666

Turbulent characteristic measurements in the marine boundary layer during GATE
N75-29667

Bulk aerodynamic description of turbulent fluxes at the surface with and without precipitation --- air water interactions
N75-29668

On representativity of wave measurements made by Soviet ships during Tropical Experiment-74
N75-29679

On some questions of interaction between the Ocean and atmosphere in the northern part of A/B scale
N75-29682

The experiment of investigation of the dynamics of the upper ocean layer at the Equator
N75-29683

Preliminary analysis of ocean internal wave observations by acoustic soundings
N75-29684

Federal plan for environmental data buoys
[COM-75-10511/4] N75-29699

A statistical verification of a ten year time series of computed surface wind conditions over the North Pacific and North Atlantic Oceans
[AD-A005869] N75-29704

Project Stormwater: The collection of bathythermographic data and airborne radiation sea surface temperature measurements in the wake of hurricane Irah
[AD-A005909] N75-29717

Transformation in the atmosphere of solar radiation reflected from the ocean --- statistical correlation
[NASA-TT-F-16487] N75-29979

Spectral structure of the field of solar radiation reflected by the ocean-atmosphere system
[NASA-TT-F-16488] N75-29980

OCEANOGRAPHY
Hydrostatic pressure equilibrated tensiometer
[AD-A006282] N75-29710

OHIO
Ohio Skylab EREP investigation
[E75-10365] N75-29507

Ohio Skylab EREP investigation
[E75-10373] N75-29515

OIL EXPLORATION
Investigation of relationships between linears, total and hazy areas, and petroleum production in the Williston Basin: An ERTS approach
[E75-10384] N75-29526

OIL FIELDS
Investigation of relationships between linears, tonal and hazy anomalies, and petroleum production in the Williston Basin: An ERTS approach
[E75-10370] N75-29512

Investigation of relationships between linears, total and hazy areas, and petroleum production in the Williston Basin: An ERTS approach
[E75-10384] N75-29526

OIL SLICKS
Oil-pollution detection and monitoring from space using ERTS-1
[E75-10381] N75-29523

Source identification of oil spills by pattern recognition analysis of natural elemental composition
[AD-A006471] N75-29580

OILS
A guide to the viscosity of liquid petroleum products
[ESDU-71003] N75-29346

A short study of the effect of a penetrant oil on the fatigue life of a riveted joint
[ARC-CP-1305] N75-29483

Oil and US policy
[AD-A006473] N75-29558

OMEGA NAVIGATION SYSTEM
Engineering studies in support of the implementation plan for the distress alerting and locating system DALS, volume 1
[AD-A005273] N75-29082

The quality of upper air observations in the GATE B-area --- using Omega and VLF navigation systems and balloon sounding
N75-29652

ONBOARD EQUIPMENT
ESRO-4 mission and operational programme
[ESRO-TN-116-ESTEC] N75-29158

OPERATING SYSTEMS [COMPUTERS]
CAMAC: Group manipulation system
[PB-240495/2] N75-29798

OPERATING TEMPERATURE
Operating limitations of high speed jet lubricated ball bearings
[NASA-TM-X-71678] N75-29429

OPERATIONS RESEARCH
Flight control and the effectiveness of an aviation system
[NASA-TT-F-16262] N75-29126

OPERATORS [MATHEMATICS]
Integral operators for parabolic equations and their application
[AD-A006244] N75-29833

OPTICAL COMMUNICATION
Experiment definition phase shuttle laboratory LDRL-10.6 experiment --- applying optical communication
[NASA-CR-144656] N75-29164

OPTICAL DATA PROCESSING
A study to analyze six band multispectral images and fabricate a Fourier transform detector --- optical data processing - aerial photography/forests
[NASA-CR-120684] N75-29388

OPTICAL DENSITY
On microstructure of clouds in the eastern zone of the Atlantic
N75-29654

OPTICAL PROPERTIES
Light absorption in suspensions of large soft particles of arbitrary shape
[AD-A005970] N75-29893

OPTICAL PUMPING
Light conversion in dye lasers
[BLL-M-23559-[5828.4F]] N75-29405

OPTICAL RADAR
COAT measurements and analysis
[AD-A006105] N75-29890

OPTICAL WAVEGUIDES
Waveguide gas laser
[AD-A006410] N75-29416

OPTIMAL CONTROL
Optimal control concepts in the design of turbine blades and blades
N75-29274

A hybrid approach to optimal control problems with bounded state. Part 1: Theory
[AD-A006191] N75-29815

Decentralized regulation of dynamic systems --- for controlling large scale linear systems
N75-29851

OPTIMIZATION
Theoretical effect of modifications to the upper surface of two NACA airfoils using smooth polynomial additional thickness distributions which emphasize leading edge profile and which vary linearly at the trailing edge
[NASA-CR-137717] N75-29030

An improved numerical procedure for the parametric optimization of three dimensional scramjet nozzles --- supersonic combustion ramjet engines - computer programs
[NASA-CR-132695] N75-29359

Optimizing the efficiency of computer-aided instruction
[AD-A006424] N75-29797

Characterization of optimality in convex programming without a constraint qualification
[AD-A005903] N75-29800
ORBIT CALCULATION
The evolution of the PROP6 orbit determination program and related topics --- satellite observations
[RAE-TR-74164] N75-29150
Calculation of changes in the period of a satellite based on synchronous visual observations --- spacecraft trajectories - orbit calculation
[AD-A006095] N75-29151
ORBIT MANEUVERING ENGINE [SPACE SHUTTLE]
Propulsion technology needs for advanced space transportation systems --- orbit maneuvering engine [space shuttle], space shuttle boosters
[NASA-TM-X-71783] N75-29173
ORBITAL MECHANICS
Orbital requirements for the Astronomical Roentgen Observatory Satellite
[RAE-TR-74110] N75-29149
ORBITAL WORKSHOPS
A month on Salyut-4
[NASA-TT-F-16419] N75-29143
Combined docking and grasping device
[NASA-CASE-MFS-23088-1] N75-29160
OREGON
Ecological characteristics of the Boardman Site and environs, Morrow County, Oregon --- environmental impact of electrical power generating stations
[PB-241071/0] N75-29502
ORGANIC COMPOUNDS
Thermal conductivity of liquid monobasic alkanoic acids
[ESDU-72007] N75-29208
ORGANIC LIQUIDS
Thermal conductivity of liquid aliphatic hydrocarbons. 1: Alkanes
[ESDU-75003] N75-29193
Thermal conductivity of liquid aromatic compounds containing oxygen
[ESDU-74032] N75-29194
ORGANIC PHOSPHORUS COMPOUNDS
A structure activity study of oximes aiming at prophylaxis against organophosphates
[CL-1974-23] N75-29744
ORIFICES
Fine orifice injector development
[AD-A006204] N75-29418
ORTHOTROPISM
The Rayleigh velocity for a slightly anisotropic, orthotropic solid
[AD-A006148] N75-29920
OTOLITH ORGANS
On the otoliths and their origin
[NASA-TT-F-16470] N75-29741
Studies on the otoliths of the teleosts
[NASA-TT-F-16471] N75-29742
OXIDATION
High speed reacting and radiating flows --- radiative heat transfer - graphite/surface reactions/oxidation - reentry physics
[AD-A006460] N75-29374
OXIDATION RESISTANCE
Effect of magnesium oxide content on oxidation behavior of some superalloy-base cermets
[NASA-TM-X-3265] N75-29187
OXYGEN
Effect of oxygen impurity on the pressure-sintering of aluminum nitride
[NASA-TT-F-16452] N75-29237
Atmospheric measurements at millimeter wavelengths
[AD-A006128] N75-29626
OXYGEN ATOMS
Investigations on the behavior of excited methyl-fluoride molecules in proximity of atoms
[REPT-8/1974] N75-29872
OXYGEN ISOTOPES
Stripping to unbound states --- on targets of beryllium, carbon, and oxygen isotopes
N75-29877
OXYGEN SUPPLY EQUIPMENT
Evaluation of the electrochemical O2 concentrator as an O2 compressor
[NASA-CR-137688] N75-29436
Improved mine rescue breathing apparatus
[PB-241105/6] N75-29787
OZONE
Removal of manganese from mine drainage by ozone and chlorine
[PB-241143/7] N75-29541
Determination of the feasibility of the long-range transport of ozone or ozone precursors
[PB-241159/3] N75-29617

P

PACIFIC OCEAN
A statistical verification of a ten year time series of computed surface wind conditions over the North Pacific and North Atlantic Oceans
[AD-A005869] N75-29704
PACKAGING
Space food preparation and packaging. A menu for cosmonauts and 'space' bread
[NASA-TT-F-16467] N75-29720
PADDLES
Thermal vacuum acceptance test of no. 2 Hawker Siddeley dynamics low speed mechanism --- solar paddle drive mechanism
[ESRO-ESTL-10] N75-29095
Thermal vacuum qualification test of no. 1 Marconi Space and Defence Systems low speed mechanisms --- for geostationary satellite solar paddle
[ESRO-ESTL-11] N75-29451
PALMGREN-MINER RULE
Thoughts on miner's fatigue damage rule
[BLL-RAE-TRANS-5027-[1609]]
N75-29448
PANELS
The thickness effect in plane stress fracture toughness
[NLR-TR-74032-U] N75-29487
Mode interaction with stiffened panels
[VTH-180] N75-29489
PARABOLIC DIFFERENTIAL EQUATIONS
An H sup [-1] Galerkin method for parabolic problems in a single space variable
[AD-A006541] N75-29826
Complete families of solutions for parabolic equations with analytic coefficients
[AD-A005820] N75-29829
Convergence of higher order pseudoparabolic partial differential equations
[AD-A005823] N75-29830
The approximation of solutions to initial-boundary value problems for parabolic equations in one space variable
[AD-A006233] N75-29831
Integral operators for parabolic equations and their application
[AD-A006244] N75-29833
PARACHUTE DESCENT
Determining the trajectories of multiple objects using stereophotography and photogrammetry
[RAE-TM-IR-148] N75-29391
PARACHUTES
A parachute opening shock theory based on nonlinear time histories of inflow velocity and projected area
[AD-A005271] N75-29057
PARKS
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
PARTIAL DIFFERENTIAL EQUATIONS
Finite element solutions for the equations of ground-water flow
[PB-240813/6] N75-29542
Convergence of higher order pseudoparabolic partial differential equations
[AD-A005823] N75-29830
Constructive methods for solving delta sub 4, sup 2 u + A delta sub 4 u sub T + C delta sub 4 u + D u equals 0
[AD-A006261] N75-29839
Conservation forms of gas dynamic equations
N75-29993
PARTICLE BEAMS
Experimental investigation of beams exhausted from a 5cm mercury electronbombardment ion engine
[NAL-TR-398] N75-29176
PARTICLE COLLISIONS
Experimental studies of the collisional excitation of infrared active vibrational stretch modes in CO2 and H2O with an intersecting, hyperthermal molecular beam apparatus, volume I
[AD-A006237] N75-29886
PARTICLE MOTION
Inter-particle percolation. Part 1: Demonstration of the phenomenon and equipment development --- granular materials, shear strain
[OUEL-1102/74-PT-1] N75-29864
Inter-particle percolation. Part 2: Results and discussion --- granular materials, shear strain
[OUEL-1103/74-PT-2] N75-29865
PARTICLE SIZE DISTRIBUTION
Drop formation from single nozzles at high nozzle velocities in liquid-liquid systems
[BLL-RTS-9364] N75-29349
Particulate contamination spectrometer. Volume 1: Technical report
[NASA-CR-144375] N75-29407
Interferometric instrumentation for particle size analysis
[AD-A006136] N75-29425
Microphysical characteristics of local fogs
[AD-A006075] N75-29697
PARTICLE TRACKS
Width measurements on short tracks of cosmic ray nuclei in nuclear emulsion
[LUIP-CR-74-13] N75-29987
PARTICLE TRAJECTORIES
Erosion in radial inflow turbines. Volume 5: Computer programs for tracing particle trajectories
[NASA-CR-134787] N75-29109
PARTICLES
Light absorption in suspensions of large soft particles of arbitrary shape
[AD-A005970] N75-29893
PASSENGERS
Passenger conveyor economics: Costs, capacity and user benefits
[TT-7409] N75-29069
PATIENTS
A simulation of the Emergency Clinic and Department of Primary Care at the Wright-Patterson AFB Medical Center
[AD-A006345] N75-29750
PATTERN RECOGNITION
Pattern and motion characteristics of visually time-compressed target detection in static noise
[AD-A006384] N75-29307
Source identification of oil spills by pattern recognition analysis of natural elemental composition
[AD-A006471] N75-29580
PAVEMENTS
Porous friction surface course --- for airport pavements
[AD-A009012] N75-29134
Characteristics of and factors influencing bituminous materials and mixture
[PB-240957/1] N75-29191
Comparative performance of structural layers in pavement systems. Volume 3: Design and construction of MESL
[AD-A005893] N75-29472
Load deflection behavior of lime stabilized layers
[AD-A006015] N75-29494
PENETRANTS
A short study of the effect of a penetrant oil on the fatigue life of a riveted joint
[ARC-CP-1305] N75-29483
PENNSYLVANIA
Processing ERTS and Aircraft MSS data with the General Electric Image 100 system
[E75-10362] N75-29504
Construction of Philadelphia Electric Company's Fulton generating station, units 1 and 2. Dockets nos. 50-463 and 50-464 --- environmental impact statement
[PB-241165/0] N75-29551
PERCOLATION
Inter-particle percolation. Part 1: Demonstration of the phenomenon and equipment development --- granular materials, shear strain
[OUEL-1102/74-PT-1] N75-29864
Inter-particle percolation. Part 2: Results and discussion --- granular materials, shear strain
[OUEL-1103/74-PT-2] N75-29865
PERFORMANCE PREDICTION
Thrust chamber life prediction. Volume 1: Mechanical and physical properties of high performance rocket nozzle materials
[NASA-CR-134806] N75-29238
The measurement of operator capacity by manipulation of dual task demands
[AD-A006352] N75-29765
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 1: Technical report
[PB-240920/9] N75-29783
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 2: Accelerator sled test data
[PB-241121/3] N75-29784
PERFORMANCE TESTS
ASR-ORTOLAN seakeeping trials [as build configuration] --- seaworthiness evaluation of monohulled ships
[AD-A006249] N75-29711
Evaluating maintenance performance test administrator's manual and text subject's instructions for criterion referenced job task performance tests for electronic maintenance
[AD-A005785] N75-29768
PERIODIC VARIATIONS
On the orders of the values of the meteorological elements obtained in the A/B array in the period of GATE
N75-29650
World climate and world food systems 3: The lessons of climatic history
[PB-240872/2] N75-29691
PERSONNEL DEVELOPMENT
Aeronautics in the American Society
N75-29002
Some developing concepts of engineering education
N75-29003
Current and future opportunities in aeronautical engineering
N75-29004
The predicament of aeronautical engineering education and what we can do about it
N75-29005
The predicament of aeronautical engineering education and what we can do about it
N75-29006
The ME/DE degree at the University of Kansas
N75-29017

A proposed university/industry/government cooperative aero educational program
N75-29018
University/government/industry relations in aeronautics
N75-29019
Curriculum for modern aeronautics
N75-29023
Engineering education for the 1980's: A speculation
N75-29024
What kind of students should be developed through aeronautical engineering education?
N75-29025
An evaluation of the major qualifications desired of Air Force system program managers
[AD-A006360] N75-29940

PERSONNEL MANAGEMENT
A study on medical officer career management and retention in the USA armed forces
N75-29729
An evaluation of the major qualifications desired of Air Force system program managers
[AD-A006360] N75-29940

PERTURBATION
Station coordinates in the standard earth 3 system and radiation-pressure perturbations from ISAGEX camera data
[NASA-CR-143315] N75-29535
The structure of robust observers
[NASA-TM-X-64950] N75-29819

PHASE SHIFT CIRCUITS
Efficiency of a phased array antenna as a function of phase shifter loss and mismatch due to mutual coupling
[PHL-1974-31] N75-29321

PHASE TRANSFORMATIONS
Polydichlorophosphazene: Thermomechanical behavior
[AD-A005911] N75-29265
Future utilization of space: Silverton Conference on material science and phase transformations in zero-gravity, summary of proceeding
[NASA-CR-141936] N75-29908

PHASED ARRAYS
Adaptive angle tracking --- with phased array antennas
[AD-A006279] N75-29306
Efficiency of a phased array antenna as a function of phase shifter loss and mismatch due to mutual coupling
[PHL-1974-31] N75-29321
A wide-angle scan matching technique for an infinite plane phased array antenna
[PHL-1974-33] N75-29322
The estimation of the direction of radar targets
[PHL-1975-01] N75-29324
COAT measurements and analysis
[AD-A006105] N75-29890

PHONETICS
Syllable detection in continuous speech
[AD-A005718] N75-29812
A phonological rules system --- computer techniques - speech recognition
[AD-A005826] N75-29813

PHOSPHATES
Legal aspects of phosphate mining in North Carolina
[COM-75-10504/9] N75-29540

PHOSPHORUS COMPOUNDS
Development document for effluent limitations guidelines and new source performance standards for the phosphorus derived chemicals segment of the phosphate manufacturing point source category
[PB-241018/1] N75-29579
Polyphosphazenes: Thermomechanical transitions
[AD-A006328] N75-29919

PHOTOCHEMICAL REACTIONS
Development and utility of reactivity scales from smog chamber data --- hydrocarbons
[PB-241248/4] N75-29598

PHOTOCONDUCTIVITY
The effect of gases on the conductive properties of organic semiconductors. Part 5: Results for films of chloranil, phenanthrene, phenazine, phtalocyanine (metal free) and crystal violet
[CL-1974-13-PT-5] N75-29917

PHOTODISSOCIATION
Formal kinetics of reactions occurring in photodissociation gas lasers
[AD-A005954] N75-29220

PHOTOELASTIC ANALYSIS
Strength of axial flow compressor blade roots. Photoelastic stress analysis of the pin joint lug
[NAL-TR-403] N75-29476

PHOTOELECTRIC EMISSION
Valence band density of states of amorphous and trigonal selenium determined by X-ray and UV photoemission
[AD-A006168] N75-29190
Photoelectron emission analysis of surface elements of the International Sun Earth Explorer
[NASA-CR-143811] N75-29916

PHOTOELECTRONS
Low fluence calculation of photoelectron flux densities outside an emitting sphere
[AD-A005825] N75-29866
Photoelectron emission analysis of surface elements of the International Sun Earth Explorer
[NASA-CR-143811] N75-29916

PHOTOGRAMMETRY
Determining the trajectories of multiple objects using stereophotography and photogrammetry
[RAE-TM-IR-148] N75-29391

PHOTOGRAPHIC FILM
Skylab program payload integration. Skylab film environmental effects
[NASA-TM-X-64951] N75-29387

PHOTOGRAPHS
Image processing and data reduction of Apollo low light level photographs
[NASA-CR-144659] N75-29389

PHOTOMETERS
Mass-production model of automatic RDV-1 photometer for measuring and recording atmospheric transparency
[AD-A006076] N75-29394
UBV photometry of asteroid 433 Eros
[NASA-CR-143316] N75-29963

PHOTOMETRY
Photometric research for the K2, 3 chromospheric flocculi
N75-29982

PHOTOVOLTAIC EFFECT
Long wave sensitivity of solar converters N-CdS-Cu[2-x]S
[AD-A005918] N75-29566

PHYSICAL PROPERTIES
The chemical deposition of dispersion coatings with Ni-P and Ni-B matrices. Embedding of oxides: Titanium dioxide
[BLL-LTI-746-01460-[9022.401]]
N75-29235
The effects of the physical and chemical properties of soils on the spectral reflectance of soils
[NASA-CR-144379] N75-29534

PIEZOELECTRIC TRANSDUCERS
Acoustic signal processing devices [surface wave transducer study]
[AD-A006257] N75-29335

PILOT PERFORMANCE
The measurement of operator capacity by manipulation of dual task demands
[AD-A006352] N75-29765
Head and neck mobility of pilots measured at the eye
[RAE-TR-74158] N75-29781

PILOT TRAINING
A review of recent models of attention --- for jet pilot training
[AD-A006155] N75-29769

PILOTS [PERSONNEL]
The aircrewman at increased risk of ischemic vascular disease
N75-29728

PIONEER SPACE PROBES
Jupiter orbiter. Study of critical aspects of a joint ESA/NASA project --- based on Pioneer H for Jupiter atmosphere mapping
[MBB-UR-V-77-74] N75-29975

PIONEER VENUS SPACECRAFT
The deep space network
[NASA-CR-143289] N75-29289

PITOT TUBES
Tests on probes designed to measure stagnation pressure directly in a supersonic stream
[ARC-R/M-3755] N75-29392

PLANAR STRUCTURES
Induced currents on two dimensional electromagnetic planar structures
[AD-A005733] N75-29339

PLANTS [BOTANY]
Certain characteristic features of flowering and pollination in duckweeds [Lemnaceae S. Gray]
[NASA-TT-F-16483] N75-29721

PLASMA ACCELERATORS
Mechanisms of magnetoplasmadynamic arc jet acceleration processes
[AD-A006234] N75-29903

PLASMA CONTROL
Heating and containment of a plasma in a small Tokamak device
[REPT-74-87] N75-29549
An external ring system for magnetic plasma confinement
[TRITA-EPP-74-08] N75-29897
Stabilization of kink disturbances by inhomogeneous magnetic fields
[TRITA-EPP-75-01] N75-29899

PLASMA CYLINDERS
THALIA: A one-dimensional magnetohydrodynamic stability program using the method of finite elements
[LRP-87/74] N75-29823

PLASMA DIAGNOSTICS
A large quiescent magnetized plasma for wave studies
[AD-A006461] N75-29900

PLASMA HEATING
Heating and containment of a plasma in a small Tokamak device
[REPT-74-87] N75-29549

PLASMA JETS
Combination automatic-starting electrical plasma torch and gas shutoff valve --- for satellite attitude control
[NASA-CASE-XLE-10717] N75-29426

PLASMA OSCILLATIONS
Destabilization of hydromagnetic drift-Alfven waves in a finite pressure collisional plasma
[AD-A006223] N75-29904

PLASMA PHYSICS
Ionospheric plasma effects
[AD-A006242] N75-29612

PLASMA PINCH
Stabilization of kink disturbances by inhomogeneous magnetic fields
[TRITA-EPP-75-01] N75-29899

PLASMA RESONANCE
Parametric instability of the sheath plasma resonance
[AD-A006489] N75-29901

PLASMA SHEATHS
A mechanism for driving the gross Birkeland current configuration in the auroral oval --- energy dissipation - plasma sheaths/geomagnetic tail
[TRITA-EPP-74-25] N75-29607
Parametric instability of the sheath plasma resonance
[AD-A006489] N75-29901

PLASMA-PARTICLE INTERACTIONS
Computer simulation of plasma and N-body problems
[NASA-CR-143286] N75-29894

PLASMAS [PHYSICS]
Charge-exchange plasma generated by an ion thruster
[NASA-CR-134844] N75-29175
Moment method solutions for the impedance of asymmetrically driven RF probes in the collisional ionospheric magnetoplasma
[AD-A006200] N75-29611
Computer simulation of plasma and N-body problems
[NASA-CR-143286] N75-29894
Plasma on earth and in space
[NASA-TT-F-16373] N75-29895
Development of solar wind shock models with tensor plasma pressure for data analysis
[NASA-CR-143301] N75-29978

PLASTICS
Development document for effluent limitations guidelines and new source performance standards for the synthetic polymer segment of the plastics and synthetic materials manufacturing point source category
[PB-240862/3] N75-29577

PLUMES
Firebird interferometer --- for observation of infrared plume emission
[AD-A005815] N75-29395

POGO EFFECTS
Aerospace Research. Bi-monthly Bulletin No. 1974-1 --- influence of combustion and hydraulic systems on pogo effects, combustion stability in swirling flow, metal matrix composite materials
[ESRO-TT-144] N75-29988
Influence of combustion phenomena on the pogo effect --- time delay parameter in combustion chamber transfer function
N75-29989

POLAR CAP ABSORPTION
Atmospheric response function for the calculation of riometer absorption
[AD-A006112] N75-29625

POLARIZATION
Multiple scattered radiation emerging from continental haze layers. 1: Radiance, polarization, and neutral points
[NASA-CR-143269] N75-29605

POLARIZATION [CHARGE SEPARATION]
Experiments --- studies using polarized beams and deuteron irradiation
N75-29876

POLARIZATION CHARACTERISTICS
Multiple scattered radiation emerging from continental haze layers. 2: Ellipticity and direction of polarization
[NASA-CR-143284] N75-29985

POLLEN
Certain characteristic features of flowering and pollination in duckweeds [Lemnaceae S. Gray]
[NASA-TT-F-16483] N75-29721

POLLUTION CONTROL
The control of nitrogen oxide emission from stationary sources
[BLL-RTS-9849] N75-29571
Airport vicinity air pollution study: The impact of modified aircraft taxi procedures on airport air quality
[AD-A009882] N75-29572
Background information for standards of performance: Electric submerged arc furnaces for

production of ferroalloys. Volume 1: Proposed standards
[EPA-450/2-74-018A] N75-29573
Sulfate control technology assessment. Phase 1: Literature search and analysis
[PB-240995/1] N75-29589
The macroeconomic impacts of federal pollution control programs
[PB-240979/5] N75-29591
Evaluation of pollution control in fossil fuel conversion processes: Gasification. Section 1: CO2 acceptor process
[PB-241141/1] N75-29596
Report to Congress on control of sulfur oxides
[PB-241021/5] N75-29597
Engineering and cost study of air pollution control for the petrochemical industry. Volume 2: Acrylonitrile manufacture
[PB-240986/0] N75-29599
The effects of air and water pollution controls on solid waste generation, 1971 - 1985. Executive summary
[PB-240739/2] N75-29600

POLLUTION MONITORING
Interfacing a 24-point analog recorder to a computer controlled telemetry line --- for water pollution monitoring
[PB-241086/8] N75-29403
Development document for effluent limitations guidelines and new source performance standards for the steam electric power generating point source category
[PB-240853/2] N75-29575
Development document for effluent limitations guidelines and new source performance standards for the primary aluminum smelting subcategory of the aluminum segment of the nonferrous metals manufacturing point source category
[PB-240859/9] N75-29576
Development document for effluent limitations guidelines and new source performance standards for the synthetic polymer segment of the plastics and synthetic materials manufacturing point source category
[PB-240862/3] N75-29577
Development document for effluent limitations guidelines and new source performance standards for the formulated fertilizer segment of the fertilizer manufacturing point source category
[PB-240863/1] N75-29578
Development document for effluent limitations guidelines and new source performance standards for the phosphorus derived chemicals segment of the phosphate manufacturing point source category
[PB-241018/1] N75-29579
Report to the Congress on ocean pollution, overfishing, and offshore development; July 1973 through June 1974
[COM-75-10509/8] N75-29593

POLYIMIDE RESINS
Polyimide adhesives
[NASA-CASE-LAR-11397-1] N75-29263

POLYIMIDES
A method of preparing aromatic polyimides having uniquely low softening temperatures
[NASA-CASE-LAR-11828-1] N75-29181
Normal incidence absorption coefficients and acoustic impedances of typical single layer fibrous lining materials --- fibermetals and polyimide laminates
[ESDU-74003] N75-29185

POLYMER CHEMISTRY
Polyimide adhesives
[NASA-CASE-LAR-11397-1] N75-29263
Polyphosphazenes: Thermomechanical transitions
[AD-A006328] N75-29919

POLYMERS
Polydichlorophosphazene: Thermomechanical behavior
[AD-A005911] N75-29265

POLYNOMIALS
The use of Bernstein polynomials in approximating a function and its derivative
[BLL-M-23707-[5828.4F]] N75-29428

POPULATIONS
Allocation methodology. Distance determinations and population catchment determinations, and their applicability to practical planning --- urban planning - information systems
[NASA-TT-F-16495] N75-29856

POROUS MATERIALS
Porous friction surface course --- for airport pavements
[AD-A009012] N75-29134

PORTABLE EQUIPMENT
Man-pack loop antenna system
[AD-A006278] N75-29326

POSITIONING
Cyclical bi-directional rotary actuator
[NASA-CASE-GSC-11883-1] N75-29430

POTENTIAL FIELDS
The computation of aerodynamic loads on helicopter blades in forward flight, using the method of the acceleration potential
[VTH-189] N75-29055

POTENTIAL FLOW
Application of the finite element method to fluid problems --- potential and viscous flow
[BLL-RTS-9414] N75-29348
Numerical calculation of two classes of potential problems, illustrated with the flow from a channel against a wedge
[WTHD-71] N75-29366
Calculation of non-lifting potential flow about arbitrary three dimensional bodies based on doublet distributions
[AD-A005877] N75-29377

POTTING COMPOUNDS
Evaluation of Ni-Cd cell covers. Results of testing of covers with protected brazing fillet
[NLR-TR-75033-C] N75-29452

POWER SPECTRA
Effort of spanwise variation of turbulence on the normal acceleration of airplanes with small span relative to turbulence scale
[NASA-TM-X-72748] N75-29036

POWER SUPPLIES
Short-pulse switches for airborne high-power supplies
[AD-A006107] N75-29340

POWER SUPPLY CIRCUITS
Power interrupt equipment
[AD-A010009] N75-29319

PRECIPITATION [METEOROLOGY]
WMO operations manual for sampling and analysis techniques for chemical constituents in air and precipitation. Part 1: The minimum programme at regional air-pollution stations. Part 2: Guidelines for baseline stations and regional stations with extended programmes
[WMO-299] N75-29574
Solar activity and precipitation within the zones of latitude 0 deg - 40 deg N
N75-29637
Investigation of the structure of precipitation areas --- using radar echoes
N75-29657

PREDICTION ANALYSIS TECHNIQUES
Theoretical prediction of airplane stability derivatives at subcritical speeds
[NASA-CR-132681] N75-29089
Potential and viscous flow prediction in V/STOL propulsion system inlets
[NASA-TM-X-71776] N75-29110
Predictive distributions in life tests under competing causes of failure
[RR-166/GAB/IRD/1] N75-29450
The application of fracture mechanics to the prediction of the fatigue life of sharply notched components
[BLL-CE-TRAN-6544-[9022.09]]
N75-29470
Mean gravity anomaly prediction from terrestrial gravity data and satellite altimeter data
[AD-A006363] N75-29619
On a comparison between the predicted and the observed values of the different indices of solar activity for the 20th solar cycle
N75-29981

PRESSURE DISTRIBUTION
Transonic data memorandum: Second-order method for estimating the subcritical pressure distribution on a two-dimensional aerofoil in compressible inviscid flow
[ESDU-72025] N75-29029

PRESSURE DRAG
Opportunities for aerodynamic-drag reduction
N75-29016

PRESSURE GRADIENTS
On turbulent diffusion in coaxial jets of dissimilar gases with pressure gradient
[NAL-TR-392T] N75-29350
Response analysis of a clamped plate to boundary layer pressure fluctuations
[NAL-TR-401] N75-29475

PRESSURE MEASUREMENTS
Tests on probes designed to measure stagnation pressure directly in a supersonic stream
[ARC-R/M-3755] N75-29392

PRESSURE REDUCTION
Evaluation by step response tests of prototype relief valves designed for YF-12 inlet stability bleed system
[NASA-TM-X-3262] N75-29118

PRESSURE SENSORS
Trielectrode capacitive pressure transducer
[NASA-CASE-ARC-10711-2] N75-29320

PRIMARY BATTERIES
Assessment of industrial hazardous waste practices, storage and primary batteries industries
[PB-241204/7] N75-29592

PRIORITIES
Study plan to identify long term national telecommunications need and priorities applying Delphi techniques [handbook] --- technological forecasting - United States of America
[NASA-CR-143833] N75-29299

PROBABILITY DISTRIBUTION FUNCTIONS
Limit theorems for the [A,B] process
[RR-168/PSC/4] N75-29843

PROBABILITY THEORY
Mixtures of invariant non-ergodic probabilities
[RR-162/MBR/1] N75-29840

PROBLEM SOLVING
An approximate method of solving boundary value problems
[BLL-M-23691-[5828.4F]] N75-29817
The approximation of solutions to initial-boundary value problems for parabolic equations in one space variable
[AD-A006233] N75-29831
Rational approximations to the solution of Fredholm integral equations
[AD-A006458] N75-29834

PROCUREMENT MANAGEMENT
An analysis of the effectiveness of ASPR in proving guidance for the utilization of government-owned industrial plant equipment
[AD-A006351] N75-29938
An investigation of a proposed auction technique as a method of procurement
[AD-A006350] N75-29939

PRODUCTION ENGINEERING
Effective ways of utilizing synthetic slags in steel making
[AD-A005982] N75-29258
Production engineering measure for high current, fast switching transistors
[AD-A005666] N75-29327

PRODUCTION MANAGEMENT
Control techniques for production processes using Bayesian estimation and exponential smoothing
[PB-241142/9] N75-29810
Cost accounting at large research centers
[BLL-RAE-TRANS-5207-[1765]]
N75-29936

PROGRAMMING LANGUAGES
The availability, reliability and maintainability of redundant systems
[AD-A006369] N75-29455
A TUTOR minicomputer system
[AD-A005782] N75-29790
PANGLOSS: A system for reading and checking files
[NPL-NAC-59] N75-29794

PROJECT MANAGEMENT
General aviation's future need for research
N75-29021
University research in aeronautics
N75-29022
Aeronautical satellite [AEROSAT] program related bibliography
[AD-A005987] N75-29154

PROJECT PLANNING
TAT welding technology training program
[PB-241047/0] N75-29447
Review of Project Independence Blueprint: Panel subcommittee reports on FEA-interagency task forces
[COM-75-10500/7] N75-29553
Design phase of an environmental technology utilization pilot project through the agricultural extension service in Tennessee
[PB-240761/7] N75-29588
Federal plan for environmental data buoys
[COM-75-10511/4] N75-29699

PROPAGATION
Simulation of digital systems consisting of elements with propagation delay time
[NAL-TR-391] N75-29792

PROPAGATION MODES
Investigation of DF laser propagation
[AD-A005631] N75-29608

PROPELLANT TESTS
Improvement of the acceptance and surveillance control of nitrate ester propellants. Part 3: Comparative investigation of stability tests for nitrate ester propellants
[TL-1974-20-PT-3] N75-29267

PROPELLANT TRANSFER
Transfer matrices of hydraulic systems. Theoretical and experimental study --- propellant transfer noting pogo effect
N75-29990

PROPELLERS
Experimental and theoretical investigations on the problem of propeller/wing interference up to high angles of attack
[NASA-TT-F-16490] N75-29035
Design of a 9 inch cycloidal propeller model unit and some experimental results
[AD-A005768] N75-29442

PROPHYLAXIS
The prophylactic effect of headcooling on coal miner's cramps. 1: Electroencephalographic observation on rabbits during head-cooling under the hot and humid environment
[NASA-TT-F-16448] N75-29739
A structure activity study of oximes aiming at prophylaxis against organophosphates
[CL-1974-23] N75-29744

PROPULSION SYSTEM CONFIGURATIONS
Conceptual design study of advanced acoustic-composite nacelles
[NASA-CR-132703] N75-29093
Application of real-time engine simulations to the development of propulsion system controls
[NASA-TM-X-71764] N75-29108
Power processing for electric propulsion
[NASA-TM-X-71775] N75-29172

PROTECTIVE CLOTHING
Protective clothing: Assessment of need, volume 1
[PB-241167/6] N75-29785
Protective clothing: Assessment of need, Volume 2
[PB-241168/4] N75-29786
Comparative characteristics of the main types of climatic clothing of Vostok Station personnel --- in Antarctic region
[AD-A005876] N75-29788
PROTECTIVE COATINGS
Development of sputtered techniques for thrust chambers
[NASA-CR-134824] N75-29248
Thermodynamics and kinetics of reactions in protective coating systems
[NASA-CR-143313] N75-29249
PROTEINS
Resistance of Nadsoniella nigra var. hesuelica to the action of a high vacuum
[NASA-TT-F-16503] N75-29732
PSEUDORANDOM SEQUENCES
BURP: A bundle repeater and restorer --- a discussion of switching theory and pseudorandom systems in signal processing
[AD-A006354] N75-29330
PSYCHOACOUSTICS
The effect of quiet on hearing --- psychoacoustics - noise [sound]
[AD-A006395] N75-29748
PSYCHOLOGICAL EFFECTS
Two men in space --- space flight stress, psychological effects
[NASA-TT-F-16493] N75-29757
PSYCHOLOGICAL TESTS
Deterministic multiple cue learning. Part 1: Effects of cue intercorrelation and presentation order
[IZF-1974-20-PT-1] N75-29760
On context effects in short term retention
[IZF-1974-28] N75-29761
PULSARS
Pulsar extinction --- astrophysics
[NASA-CR-143272] N75-29969
PULSE CODE MODULATION
Digital video: Differential coding of PAL colour signals using same-line and two-dimensional prediction
[BBC-RD-1975/20] N75-29282
PULSE DURATION MODULATION
Variable pulse width modulator exploratory development model
[AD-A006258] N75-29334
PULSE RATE
Comparison of some classes of MTI filters for a 3-pulse canceller with staggered PRF
[PHL-1974-38] N75-29323
PULSED LASERS
Waveguide gas laser
[AD-A006410] N75-29416
PURSUIT TRACKING
Manipulating the number and type of adaptive variables in training
[AD-A006229] N75-29764
PYLONS
The effect of a pylon-mounted nacelle on the flutter behaviour of a wing-pylon-nacelle configuration
[NLR-TR-74125-U] N75-29056
PYROLYSIS
Application of deuterized compounds for the study of kinetics and mechanism of the thermal conversions of hydrocarbons
[AD-A006007] N75-29184
Overall reaction rate and stoichiometry for thermal decomposition of hydrazine
N75-29266

Q

QUALITY CONTROL
Semiconductor measurement technology
[AD-A005669] N75-29329
A development and analysis of multiple range techniques for controlling the variability of a process characteristic with a uniform distribution
[AD-A006478] N75-29456
QUARKS
Weak non leptonic decays of charmed hadrons
[ISS-P-75/4] N75-29912
QUATERNARY ALLOYS
Aluminum alloys: Industrial deformable, sintered and light aluminum alloys
[AD-A005984] N75-29255
QUEUEING THEORY
Cost performance satellite design using queueing theory
[NASA-TM-X-71770] N75-29155
QUIET ENGINE PROGRAM
Preliminary design study of a quiet, high flow fan [QHF] stage --- turbofans - quiet engine program
[NASA-CR-134780] N75-29433

R

RABBITS
Effect of sectioning of the spinal cord in the midlumbar portion on heat exchange and development of fever in rabbits
[NASA-TT-F-16496] N75-29731
RADAR
FAA lightning protection study: Lightning protection requirements for the ARTS 3 system --- circuit protection - radar
[AD-A009662] N75-29131
RADAR ANTENNAS
Tests with coaxial TACAN antenna at Doppler very high frequency omnirange [VOR]
[AD-A010008] N75-29080
RADAR ASTRONOMY
Evaluation of the present theoretical basis for determination of planetary surface properties by earth-based radar
[NASA-TN-D-7889] N75-29965
RADAR BEACONS
An analysis of aircraft L-band beacon antenna patterns
[AD-A005569] N75-29287
RADAR ECHOES
Investigation of the structure of precipitation areas --- using radar echoes
N75-29657
RADAR EQUIPMENT
A scan converter radar display system
[AD-A005881] N75-29316
RADAR MEASUREMENT
Radar investigations of evolution of clouds in the eastern Atlantic
N75-29658
RADAR NAVIGATION
An overview of the FAA engineering and development programs with highlights of fiscal years, 1975-1976 --- progress in aircraft safety, instrument landing systems, radar navigation, and air traffic control
[AD-A010266] N75-29063
RADAR SIGNATURES
Analysis of problems in the application of radar sensors to automotive collision prevention
[PB-240950/6] N75-29317
RADAR TRACKING
Adaptive angle tracking --- with phased array antennas
[AD-A006279] N75-29306
RADARSCOPES
Test and evaluation of a remote control and radiofrequency repeater system for televised radar display applications
[AD-786273] N75-29286
RADIAL FLOW
Erosion in radial inflow turbines. Volume 5: Computer programs for tracing particle trajectories
[NASA-CR-134787] N75-29109
RADIANCE
An intercomparison of radiosonde and satellite-derived cross sections during the AMTEX
[COM-75-10439/8] N75-29616
RADIANT COOLING
Radiation cooler for 10 micrometer wavelength engineering model receiver model no. 7172, serial no. 201
[NASA-CR-144662] N75-29362
RADIATION
Multiple scattered radiation emerging from continental haze layers. 2: Ellipticity and direction of polarization
[NASA-CR-143284] N75-29985
RADIATION EFFECTS
Effects of 60 Co on electrical self-stimulation of the brain and blood pressure
[AD-A006428] N75-29751
The effect of extremely low frequency radiation on human performance: A preliminary study
[AD-A005898] N75-29756
Monte Carlo variance reduction study --- radiation effects - material absorption/nuclear radiation
[NASA-CR-120672] N75-29818
On the determination of the photo-ionization energy and the concentration of defects created by nuclear radiation in silicon diodes
[FOA-B-30003-A3] N75-29913
RADIATION PRESSURE
Station coordinates in the standard earth 3 system and radiation-pressure perturbations from ISAGEX camera data
[NASA-CR-143315] N75-29535
RADIATION SHIELDING
ESTOQ: A program for calculation of primary shock sources for avoidance of ray-effects with two dimensional S sub N calculations
[REPT-4-17] N75-29363
RADIATION SOURCES
Electric arc light source having undercut recessed anode
[NASA-CASE-ARC-10266-1] N75-29318
Calculations of the mean regional dispersion of a radioactive gas emitted from a continuous source
[AC-29] N75-29685
Small astronomy satellite-A, Uburu data analysis
[NASA-CR-144660] N75-29964
Why are there so few X-ray stars?
[NASA-TT-F-16296] N75-29971
RADIATIVE HEAT TRANSFER
High speed reacting and radiating flows --- radiative heat transfer - graphite/surface reactions/oxidation - reentry physics
[AD-A006460] N75-29374
RADIATIVE TRANSFER
Radiation transport in axisymmetric geometries
[AD-A006252] N75-29422
Infrared radiation budget of the Harmattan haze --- West Africa
N75-29674
RADIO ASTRONOMY
Analysis of the capability and limitations of relativiatic gravity measurements using radio astronomy methods
[NASA-CR-120687] N75-29962
RADIO COMMUNICATION
Engineering studies in support of the implementation plan for the distress alerting and locating system DALS, volume 1
[AD-A005273] N75-29082
RADIO FREQUENCIES
Test and evaluation of a remote control and radiofrequency repeater system for televised radar display applications
[AD-786273] N75-29286
Generation of standard EM fields for calibration of power density meters 20 kHz to 1000 MHz
[COM-75-10395/2] N75-29404
RADIO FREQUENCY IMPEDANCE PROBES
Moment method solutions for the impedance of asymmetrically driven RF probes in the collisional ionospheric magnetoplasma
[AD-A006200] N75-29611
RADIO FREQUENCY INTERFERENCE
Space shuttle electromagnetic environment experiment. Phase A: Definition study
[NASA-CR-143834] N75-29162
Measured effects of square wave modulated RF fields [450 and 3100 MHz] on cardiac pacemakers
[AD-A006389] N75-29755
RADIO INTERFEROMETERS
Analysis of the capability and limitations of relativistic gravity measurements using radio astronomy methods
[NASA-CR-120687] N75-29962
RADIO OBSERVATION
Observations with a VLB array. The sources 3C120, 3C273, 2134 and 004, and 3C84, 3 --- radio sources
[AD-A005769] N75-29967
RADIO RECEIVERS
Radiation cooler for 10 micrometer wavelength engineering model receiver model no. 7172, serial no. 201
[NASA-CR-144662] N75-29362
RADIO RELAY SYSTEMS
Experiment definition phase shuttle laboratory: LDRL-10.6 experiment
[NASA-CR-144658] N75-29161
A radio telephone system with code division multiplexing
[BLL-PO-3206-[9022.81]] N75-29283
RADIO SOURCES [ASTRONOMY]
Free radical OH, a molecule of astrophysical and aeronomic interest --- radio sources [astronomy] - spectroscopic analysis
[NASA-SP-373] N75-29960
Observations with a VLB array. The sources 3C120, 3C273, 2134 and 004, and 3C84, 3 --- radio sources
[AD-A005769] N75-29967
RADIO TELEMETRY
Interfacing a 24-point analog recorder to a computer controlled telemetry line --- for water pollution monitoring
[PB-241086/8] N75-29403
RADIOACTIVE CONTAMINANTS
Calculations of the mean regional dispersion of a radioactive gas emitted from a continuous source
[AC-29] N75-29685
RADIOACTIVE DECAY
Weak non leptonic decays of charmed hadrons
[ISS-P-75/4] N75-29912
RADIOACTIVE MATERIALS
Environmental survey of transportation of radioactive materials to and from nuclear power plants, supplement 1
[PB-241065/2] N75-29956
RADIOMETERS
Investigation of radiometers. 4. Experimental contributions to the examination of the theories of the common single-plate radiometer
[NASA-TT-F-16480] N75-29185
RADIOSONDES
An intercomparison of radiosonde and satellite-derived cross sections during the AMTEX
[COM-75-10439/8] N75-29616
RADIOTELEPHONES
A radio telephone system with code division multiplexing
[BLL-PO-3206-[9022.81]] N75-29283

RAIL TRANSPORTATION
Energy intensity of barge and rail freight hauling
[PB-240012/5] N75-29269
Whell/track technologies --- rapid transit system research
[BMFT-FB-T-74-42] N75-29954
RAIN
Rain attenuation studies
[AD-A006123] N75-29310
On the wind, temperature, and humidity fields in the vicinity of an east-west line of showers
N75-29662
A comparison of infrared imagery and video pictures in the estimation of daily rainfall from satellite data
[COM-75-10435/6] N75-29698
RAMJET ENGINES
Ramjet technology. Chapter 6: Ramjet fuels
[AD-A006114] N75-29124
RANDOM NOISE
Comparative study of counting methods by digital simulation
[NAL-TR-408] N75-29789
RANDOM VARIABLES
The asymptotic behaviour of the Hurst range
[RR-164/PSC/3] N75-29841
Some remarks on the construction of independent identically distributed random variables and Markov chains
[RR-160/DNS/MBR/2] N75-29842
RANGE ERRORS
CO2 laser ranging systems study
[NASA-CR-144655] N75-29410
RANGEFINDING
Ionospheric effects on transionospheric measurements of range and range,difference
[AD-A006118] N75-29314
RAPID TRANSIT SYSTEMS
Whell/track technologies --- rapid transit system research
[BMFT-FB-T-74-42] N75-29954
RARE EARTH ELEMENTS
Nuclear structure research --- discussion of heavy ions, rare earth elements, and energy levels
N75-29875
Spectroscopy in the rare earth region
N75-29880
Work function and adsorption properties of yttrium group rare earth metals
[AD-A005979] N75-29922
RAY TRACING
A ray trace program for the CDC 1604 computer
[AD-A005321] N75-29869
RAYLEIGH WAVES
The Rayleigh velocity for a slightly anisotropic, orthotropic solid
[AD-A006148] N75-29920
REACTION KINETICS
Formal kinetics of reactions occurring in photodissociation gas lasers
[AD-A005954] N75-29220
Kinetics and mechanism of the thermal decomposition of salts of hydrazonium
[AD-A005994] N75-29223
Reaction between refractory metals and insulating nitrides at high temperatures
[NASA-TT-F-16477] N75-29239
Thermodynamics and kinetics of reactions in protective coating systems
[NASA-CR-143313] N75-29249
Overall reaction rate and stoichiometry for thermal decomposition of hydrazine
N75-29266
Relaxation behind strong shock waves
[AD-A005765] N75-29373
Solution of problems in physical and chemical kinetics by the Monte Carlo method
[AD-A006083] N75-29874
REACTOR MATERIALS
Safety evaluation of the energy research and development administration's loss of fluid test facility. Project no. 394
[PB-241456/3] N75-29884
REACTOR SAFETY
Safety evaluation of the Washington public power supply system, nuclear projects 1 and 4. Dockets 50-460 and 50-513
[PB-241266/6] N75-29882
Safety evaluation report of Joseph M. Farely nuclear plant, units 1 and 2
[PB-241108/0] N75-29883
Safety evaluation of the energy research and development administration's loss of fluid test facility. Project no. 394
[PB-241456/3] N75-29884
REAL TIME OPERATION
Application of real-time engine simulations to the development of propulsion system controls
[NASA-TM-X-71764] N75-29108
Carbon monoxide monitor --- using real time operation
[NASA-CASE-MFS-22060-1] N75-29380
Remote-terminal emulator [design verification model]: User's Manual
[AD-A006193] N75-29804
RECLAMATION
Ohio Skylab EREP investigation
[E75-10365] N75-29507
Ohio Skylab EREP investigation
[E75-10373] N75-29515
RECOMBINATION REACTIONS
Admixtures in germanium, silicon and gallium arsenide recombination characteristics
[AD-A006097] N75-29929
RECTANGLES
A direct method for the generation of shape functions of any desired continuity for rectangular finite elements
[TT-7501] N75-29822
RECTANGULAR PANELS
Coefficient of diffusion for a uniform parallel panel
[ESDU-02.05.01] N75-29468
RECTANGULAR WIND TUNNELS
Higher order wind tunnel corrections for a two-dimensional circular arc lifting aerofoil in a closed rectangular wind tunnel
[ARL/A-NOTE-349] N75-29034
REDUNDANCY
Digital flight control system redundancy study --- fly by wire control - aircraft guidance
[AD-A006411] N75-29129
The availability, reliability and maintainability of redundant systems
[AD-A006369] N75-29455
REENTRY EFFECTS
Reentry static stability characteristics of a [Model 471] .005479-scale 146-inch solid rocket booster tested in the NASA/MSFC 14 by 14 inch TWT [SA8F]
[NASA-CR-141549] N75-29163
REENTRY PHYSICS
High speed reacting and radiating flows --- radiative heat transfer - graphite/surface reactions/oxidation - reentry physics
[AD-A006460] N75-29374
REENTRY SHIELDING
The relative effects of entry parameters on thermal protection system weight --- space shuttle orbiters
[NASA-CR-144386] N75-29166
REFLECTANCE
Transformation in the atmosphere of solar radiation reflected from the ocean --- statistical correlation
[NASA-TT-F-16487] N75-29979
REFLECTED WAVES
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 1: Reflection indicatrix
N75-29670
REFRACTORY METALS
Reaction between refractory metals and insulating nitrides at high temperatures
[NASA-TT-F-16477] N75-29239
REGIONAL PLANNING
Ohio Skylab EREP investigation
[E75-10365] N75-29507
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
A regional land use survey based on remote sensing and other data --- Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona
[E75-10374] N75-29516
REINFORCED PLASTICS
Experimental test of the load bearing capacity of smooth glass fibre reinforced plastic hollow cylinders subjected to external hydrostatic pressure
[BLL-NEL-TT-2564-[6075.461]]
N75-29463
REINFORCEMENT (STRUCTURES)
Flat panels in shear. Buckling of long panels with transverse stiffeners
[ESDU-02.03.02] N75-29469
Fatigue behavior of welded reinforcement in reinforced concrete beams
[PB-240367/3] N75-29500
REINFORCING FIBERS
New machinery and materials --- a discussion of reinforcing fibers, whisker composites, nickel alloys, and laser applications
[AD-A005953] N75-29438
RELATIVISTIC PARTICLES
Calculations of X-ray Breusstrahlung spectra and scintillator detector yields for relativistic electron energies from 10 keV to 10 MeV
[AD-A006552] N75-29902
RELATIVISTIC THEORY
Analysis of the capability and limitations of relativistic gravity measurements using radio astronomy methods
[NASA-CR-120687] N75-29962
RELIABILITY
Computer assisted instructions in system reliability for logistics managers
[AD-A006340] N75-29461
RELIABILITY ANALYSIS
Airborne electronics for automated flight systems
N75-29011
The availability, reliability and maintainability of redundant systems
[AD-A006369] N75-29455
Large-scale systems: Complexity, stability, reliability
N75-29852
RELIABILITY ENGINEERING
Some indicators for inertial navigation systems reliability
[AD-A006439] N75-29085
Single-wing current meter housing --- reliability engineering
[AD-A006281] N75-29398
Design of hydraulic rollers for treating ceramic materials with consideration --- of reliability parameters
[AD-A006099] N75-29444
RELIEF VALVES
Evaluation by step response tests of prototype relief valves designed for YF-12 inlet stability bleed system
[NASA-TM-X-3262] N75-29118
A throat-bypass stability system for a YF-12 aircraft research inlet using self-acting mechanical valves
[NASA-TM-X-71779] N75-29128
REMOTE CONTROL
Automatic external load aquisition by helicopter
[AD-A005051] N75-29097
Test and evaluation of a remote control and radiofrequency repeater system for televised radar display applications
[AD-786273] N75-29286
Concept design of the payload handling manipulator system --- space shuttle orbiters
[NASA-TM-X-72447] N75-29773
REMOTE HANDLING
Concept design of the payload handling manipulator system --- space shuttle orbiters
[NASA-TM-X-72447] N75-29773
REMOTE SENSORS
The application of remote sensing technology to the solution of problems in the management of resources in Indiana
[NASA-CR-143317] N75-29527
Bringing remote sensing technology to the user community
[NASA-CR-141931] N75-29529
Information content of the data obtained by remote sensing of the parameters of the environment and the earth's resources from space
[NASA-TT-F-16435] N75-29533
Crop identification technology assessment for remote sensing [CITARS]. Volume 6: Data processing at the laboratory for applications of remote sensing
[NASA-CR-144374] N75-29536
REMOTELY PILOTED VEHICLES
Full-scale aerodynamic and engine testing of the APL Symdel Mk 6 RPV
[AD-A006283] N75-29099
REPEATERS
Test and evaluation of a remote control and radiofrequency repeater system for televised radar display applications
[AD-786273] N75-29286
BURP: A bundle repeater and restorer --- a discussion of switching theory and pseudorandom systems in signal processing
[AD-A006354] N75-29330
REPORTS
Activities of the Institute of Sound and Vibration Research
N75-29995
RESCUE OPERATIONS
Improved mine rescue breathing apparatus
[PB-241105/6] N75-29787
RESEARCH FACILITIES
Some developing concepts of engineering education
N75-29003
University research in aeronautics
N75-29020
Activities of the Institute of Sound and Vibration Research
N75-29995
RESEARCH MANAGEMENT
Cost accounting at large research centers
[BLL-RAE-TRANS-5207-[1765]]
N75-29936
RESEARCH PROJECTS
Some developing concepts of engineering education
N75-29003
University research in aeronautics
N75-29020
General aviation's future need for research
N75-29021
University research in aeronautics
N75-29022
RESERVOIRS
The use of LANDSAT DCS and imagery in reservoir management and operation --- Saint John River, Maine and Canada
[E75-10378] N75-29520
RESIDUAL STRESS
The thickness effect in plane stress fracture toughness
[NLR-TR-74032-U] N75-29487
RESONANCE
Analysis of the orbit of Ariel 1, 1962-15A, near 15th-order resonance
[RAE-TR-74107] N75-29148

RESONANT FREQUENCIES
Experiments on magnetoacoustic resonances in a rotating plasma
[TRITA-EPP-74-24] N75-29898
RESOURCES MANAGEMENT
The application of remote sensing technology to the solution of problems in the management of resources in Indiana
[NASA-CR-143317] N75-29527
Energy conservation study of Veterans Administration hospitals. Stage 1: Base line survey
[PB-241095/9] N75-29559
Energy conservation study of Veterans Administration hospitals. Stage 2: Operational study
[PB-241096/7] N75-29560
Energy conservation study of Veterans Administration hospitals. Stage 3: Hospital energy control system
[PB-241097/5] N75-29561
Energy conservation study of Veterans Administration hospitals. Stage 4: Basic detail data for stage 1, 2, and 3
[PB-241098/3] N75-29562
RETENTION (PSYCHOLOGY)
On context effects in short term retention
[IZF-1974-28] N75-29761
REYNOLDS NUMBER
Effects of Reynolds number and roughness on C sub Lmax --- aerodynamic characteristics of airfoil
[NAL-TR-396] N75-29026
RICE
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs --- Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain
[E75-10382] N75-29524
RIGID STRUCTURES
Mode interaction with stiffened panels
[VTH-180] N75-29489
RING DISCHARGE
Experiments on magnetoacoustic resonances in a rotating plasma
[TRITA-EPP-74-24] N75-29898
RING STRUCTURES
An external ring system for magnetic plasma confinement
[TRITA-EPP-74-08] N75-29897
RIOMETERS
Atmospheric response function for the calculation of riometer absorption
[AD-A006112] N75-29625
RIVERS
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
The use of LANDSAT DCS and imagery in reservoir management and operation --- Saint John River, Maine and Canada
[E75-10378] N75-29520
A bibliography of numerical models for tidal rivers, estuaries and coastal waters
[COM-75-10477/8] N75-29712
RIVETED JOINTS
A short study of the effect of a penetrant oil on the fatigue life of a riveted joint
[ARC-CP-1305] N75-29483
ROBOTS
Robot manipulators --- in space exploration
[NASA-TT-F-16482] N75-29780
ROCKET ENGINES
A fully coupled underexpanded afterburning rocket plume program [the AIPP code]. Part 1: Analytical and numerical techniques
[AD-A006235] N75-29180
ROCKET EXHAUST
A fully coupled underexpanded afterburning rocket plume program [the AIPP code]. Part 1: Analytical and numerical techniques
[AD-A006235] N75-29180
ROCKET NOZZLES
Thrust vector control by secondary injection into rocket nozzles
[NAL-TR-409] N75-29178
Thrust chamber life prediction. Volume 1: Mechanical and physical properties of high performance rocket nozzle materials
[NASA-CR-134806] N75-29238
ROCKET THRUST
Thrust measurement
[NASA-CASE-XMS-05731] N75-29382
RODS
Dynamic method of investigating the stability of a compressed rod --- structural stability
[AD-A005965] N75-29499
ROLLERS
Design of hydraulic rollers for treating ceramic materials with consideration --- of reliability parameters
[AD-A006099] N75-29444
ROTARY STABILITY
Stability and transient motion of a hydrodynamic horizontal three-lobe bearing system
N75-29275
ROTARY WINGS
The computation of aerodynamic loads on helicopter blades in forward flight, using the method of the acceleration potential
[VTH-189] N75-29055
A computer program for helicopter rotor noise using Lowson's formula in the time domain
[NASA-TM-X-72759] N75-29116
A simulation study of active feedback supression of dynamic response in helicopter rotor blades
[NASA-CR-132711] N75-29127
ROTATING DISKS
Numerical integration of the momentum-integral equations and application of the results to the flow between rotating disks
[VTH-183] N75-29369
ROTATING PLASMAS
Experiments on magnetoacoustic resonances in a rotating plasma
[TRITA-EPP-74-24] N75-29898
ROTATING SHAFTS
Cyclical bi-directional rotary actuator
[NASA-CASE-GSC-11883-1] N75-29430
RUNWAY CONDITIONS
Porous friction surface course --- for airport pavements
[AD-A009012] N75-29134
RUNWAYS
Comparative performance of structural layers in pavement systems. Volume 3: Design and construction of MESL
[AD-A005893] N75-29472
A computer program for rigid pavement evaluation
[AD-A006140] N75-29496
Remote sensing over North Merritt Island --- space shuttle runway
[E75-10371] N75-29513
On the methodology of measuring visual range for aviation purposes
[BLL-M-23694-[5828.4F]] N75-29631

S

SAFEGUARD SYSTEM
Model studies of drifting snow patterns at safeguard facilities in North Dakota
[AD-A006018] N75-29701
SAFETY DEVICES
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 1: Technical report
[PB-240920/9] N75-29783
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 2: Accelerator sled test data
[PB-241121/3] N75-29784
SAFETY MANAGEMENT
Technology and current practices for processing, transferring and storing liquefied natural gas
[PB-241048/8] N75-29271
Preliminary safety analysis of lithium batteries
[AD-A006149] N75-29569
Safety evaluation of the Washington public power supply system, nuclear projects 1 and 4. Dockets 50-460 and 50-513
[PB-241266/6] N75-29882
Safety evaluation report of Joseph M. Farely nuclear plant, units 1 and 2
[PB-241108/0] N75-29883
Safety evaluation of the energy research and development administration's loss of fluid test facility. Project no. 394
[PB-241456/3] N75-29884
SALINITY
Anomalous variations in temperature-salinity relationships at GATE station 7
N75-29680
Variations of temperature, salinity and currents in the mixed layer and the thermocline [preliminary results]
N75-29681
SALTON SEA [CA]
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
SALYUT SPACE STATION
Soyuz 14: Salyut-3 flight
[NASA-TT-F-16466] N75-29140
A month on Salyut-4
[NASA-TT-F-16419] N75-29143
SAMPLERS
Silicon-32 fiber sampler --- extraction of cosmogenic silicon from sea water
[AD-A006275] N75-29714
In-situ separator --- for microorganisms
[AD-A006274] N75-29734
SANDS
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
Rio Blanco massive hydraulic fracturing demonstration
[PB-240849/0] N75-29614
SAS-C
Interactions between SAS-C spacecraft nutations and spin-rate control system
[AD-A006115] N75-29152
SATELLITE ANTENNAS
Design, manufacture and test of an electrical model of a shaped beam antenna for a maritime satellite
[ESRO-CR[P]-644] N75-29303
Some characteristics of a communication satellite multiple-beam antenna
[AD-A006405] N75-29311
SATELLITE ATTITUDE CONTROL
The Skynet 2 attitude sensor prediction and events program WINK 2
[RAE-TR-74091] N75-29147
Mathematical modelling of the RAE lightweight flexible solar array
[RAE-TR-74112] N75-29157
Silicon star sensor --- for satellite attitude control
[AD-A006482] N75-29402
Combination automatic-starting electrical plasma torch and gas shutoff valve --- for satellite attitude control
[NASA-CASE-XLE-10717] N75-29426
SATELLITE DESIGN
Cost performance satellite design using queueing theory
[NASA-TM-X-71770] N75-29155
SATELLITE OBSERVATION
The evolution of the PROP6 orbit determination program and related topics --- satellite observations
[RAE-TR-74164] N75-29150
Station coordinates in the standard earth 3 system and radiation-pressure perturbations from ISAGEX camera data
[NASA-CR-143315] N75-29535
Mean gravity anomaly prediction from terrestrial gravity data and satellite altimeter data
[AD-A006363] N75-29619
SATELLITE ORBITS
Analysis of the orbit of Ariel 1, 1962-15A, near 15th-order resonance
[RAE-TR-74107] N75-29148
Orbital requirements for the Astronomical Roentgen Observatory Satellite
[RAE-TR-74110] N75-29149
Calculation of changes in the period of a satellite based on synchronous visual observations --- spacecraft trajectories - orbit calculation
[AD-A006095] N75-29151
SATELLITE ORIENTATION
Interactions between SAS-C spacecraft nutations and spin-rate control system
[AD-A006115] N75-29152
SATELLITE-BORNE INSTRUMENTS
The Skynet 2 attitude sensor prediction and events program WINK 2
[RAE-TR-74091] N75-29147
An intercomparison of radiosonde and satellite-derived cross sections during the AMTEX
[COM-75-10439/8] N75-29616
SATELLITE-BORNE PHOTOGRAPHY
Atmospheric disturbances over the Atlantic GATE area as seen from satellite data --- cyclones
N75-29642
Identification, tracking, and sources of Saharan dust: An inquiry using SMS
N75-29664
SCALE MODELS
Reentry static stability characteristics of a [Model 471] .005479-scale 146-inch solid rocket booster tested in the NASA/MSFC 14 by 14 inch TWT [SA8F]
[NASA-CR-141549] N75-29163
Analysis of plastic models of ship structures using holograph and strain gages --- holographic displacement and vibration analyses
[AD-A006269] N75-29399
Large scale dynamic systems
[NASA-SP-371] N75-29845
Simulation of large-scale dynamic systems
N75-29846
Hierarchical models of very large problems, dilemmas, prospects, and an agenda for the future
N75-29847
An informal paper on large-scale dynamic systems
N75-29848
Survey of decentralized control methods --- for large scale dynamic systems
N75-29849
Some notions of decentralization and coordination in large-scale dynamic systems
N75-29854
SCANNING
A wide-angle scan matching technique for an infinite plane phased array antenna
[PHL-1974-33] N75-29322
SCHEDULING
A simulation of the Emergency Clinic and Department of Primary Care at the Wright-Patterson AFB Medical Center
[AD-A006345] N75-29750
SCINTILLATION COUNTERS
Calculations of X-ray Breusstrahlung spectra and scintillator detector yields for relativistic electron energies from 10 keV to 10 MeV
[AD-A006552] N75-29902

SEA WATER
Silicon-32 fiber sampler --- extraction of cosmogenic silicon from sea water
[AD-A006275] N75-29714
SEASONS
A regional land use survey based on remote sensing and other data --- Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona
[E75-10374] N75-29516
SECONDARY INJECTION
Thrust vector control by secondary injection into rocket nozzles
[NAL-TR-409] N75-29178
SECURITY
A model for data secure systems, part 2
[AD-A006276] N75-29803
SEDATIVES
Effects of hypnotic drugs on performance before and after sleep
[NASA-CR-143311] N75-29743
SEDIMENTS
Taking cores from unconsolidated sediments of the shelf area using a vibration-hammer corer
[BLL-M-23679-[5828.4F]] N75-29705
SEISMIC WAVES
Comparison of orthogonal transforms for teleseismic data
[AD-A006232] N75-29609
Source studies in the near and far field, part A
[AD-A005786] N75-29622
NORSAR phase 3
[AD-A005775] N75-29623
SEISMOGRAPHS
Project T/3703 — evaluation of seismograph systems for the detection of underground nuclear explosions
[AD-A006437] N75-29613
NORSAR phase 3
[AD-A005775] N75-29623
Seismic discrimination
[AD-A006194] N75-29624
SEISMOLOGY
Identification of earthquakes and underground explosions
[AD-A006467] N75-29621
SELENIDES
Amorphous semiconductors
[AD-A005831] N75-29931
SELENIUM
Valence band density of states of amorphous and trigonal selenium determined by X-ray and UV photoemission
[AD-A006168] N75-29190
SELF EXCITATION
Study of methods to suppress self-excitation in O-type Traveling Wave Tubes [TWT]
[NASA-TT-F-16479] N75-29292
SEMICONDUCTING FILMS
Research on semiconductor physics in the Electrophysical Department, 25th anniversary of the founding of V. I. Lenin Kishinev State University --- crystal growth
[AD-A006092] N75-29927
SEMICONDUCTOR DEVICES
Low-level modulator and isolator-limiter-detector development --- for use at ultrahigh frequencies
[AD-A006296] N75-29308
Semiconductor measurement technology
[AD-A005669] N75-29329
SEMICONDUCTOR LASERS
Development of tunable semiconductor lasers for application to air pollution measurements
[PB-241030/6] N75-29423
SEMICONDUCTORS [MATERIALS]
Vapor deposition apparatus --- semiconductors and gallium arsenides
[NASA-CASE-HQN-10462] N75-29192
Modulation spectroscopy of layer semiconductors GaSe and GaTe
[ISS-L-74/2] N75-29911
The effect of gases on the conductive properties of organic semiconductors. Part 5: Results for films of chloranil, phenanthrene, phenazine, phtalocyanine [metal free] and crystal violet
[CL-1974-13-PT-5] N75-29917
Investigation of ion implantation as a doping technique for the 3-5 semiconductors and ternary alloy systems
[AD-A006465] N75-29926
Research on semiconductor physics in the Electrophysical Department, 25th anniversary of the founding of V. I. Lenin Kishinev State University --- crystal growth
[AD-A006092] N75-29927
Semiconductor microelectronics --- integrated circuits
[AD-A006074] N75-29928
Admixtures in germanium, silicon and gallium arsenide recombination characteristics
[AD-A006097] N75-29929
Amorphous semiconductors
[AD-A005831] N75-29931
Characterization of silicon carbide
[AD-A006409] N75-29932
SEPARATION
Effect of sectioning of the spinal cord in the midlumbar portion on heat exchange and development of fever in rabbits
[NASA-TT-F-16496] N75-29731
SEPARATORS
In-situ separator --- for microorganisms
[AD-A006274] N75-29734
SEQUENCING
Methods of handling sequence effects in human factors engineering experiments
[AD-A006240] N75-29770
SERVICE LIFE
Optimization of the time between aircraft overhauls by minimizing maintenance cost
[AD-A006505] N75-29100
SET THEORY
The structure of robust observers
[NASA-TM-X-64950] N75-29819
F-convex functions
[AD-A005900] N75-29836
SHAPES
A direct method for the generation of shape functions of any desired continuity for rectangular finite elements
[TT-7501] N75-29822
SHEAR STRAIN
Flat panels in shear. Buckling of long panels with transverse stiffeners
[ESDU-02.03.02] N75-29469
Inter-particle percolation. Part 1: Demonstration of the phenomenon and equipment development --- granular materials, shear strain
[OUEL-1102/74-PT-1] N75-29864
Inter-particle percolation. Part 2: Results and discussion --- granular materials, shear strain
[OUEL-1103/74-PT-2] N75-29865
SHELL THEORY
Spectroscopy in the sd and fp shells --- gamma ray spectroscopy
N75-29878
SHIP HULLS
ASR-ORTOLAN seakeeping trials [as build configuration] --- seaworthiness evaluation of monohulled ships
[AD-A006249] N75-29711
SHIPS
Analysis of plastic models of ship structures using holograph and strain gages --- holographic displacement and vibration analyses
[AD-A006269] N75-29399
Design of a 9 inch cycloidal propeller model unit and some experimental results
[AD-A005768] N75-29442
Improved seagoing scale
[AD-A006321] N75-29713
Newest methods of air distribution in conditioning systems on naval transport vessels
[NASA-TT-F-16498] N75-29775
SHOCK ABSORBERS
Parameter optimization of vibration absorbers and shock isolators by root-locus technique
N75-29276
SHOCK LAYERS
Numerical computation of three-dimensional blunt body flow fields with an impinging shock
[NASA-CR-143312] N75-29038
SHOCK SPECTRA
The Shock and Vibration Digest, Volume 7, No. 2, February 1975 --- finite element method
[AD-A006665/4] N75-29465
SHOCK TUBES
A thin film catalytic-non-catalytic heat transfer gauge for shock tube measurements in reacting gases
[AASU-336] N75-29390
Experiments of nonequilibrium, nonstationary expansion of water vapour/carrier gas mixture in a shock tube
[UTIAS-195] N75-29863
SHOCK WAVES
A numerical determination of the bow shock wave in transonic axisymmetric flow about blunt bodies
[NASA-TM-X-72448] N75-29033
The disturbance of the mixing region of two planar jets by means of a shock wave
[NASA-TT-F-16507] N75-29358
Relaxation behind strong shock waves
[AD-A005765] N75-29373
Development of solar wind shock models with tensor plasma pressure for data analysis
[NASA-CR-143301] N75-29978
SHORELINES
Systematic variations in inshore bathymetry
[AD-A006393] N75-29709
SHORT CIRCUITS
Analysis of fires caused by short circuits in cable networks in mines in the Ukrainian SSR
[AD-A006002] N75-29336
SIERRA NEVADA MOUNTAINS [CA]
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs --- Sierra-Labontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain
[E75-10382] N75-29524
SIGNAL ANALYSIS
A new transient signal analysis unit --- aerodynamic percussion analysis using magnetic disk unit
N75-29994
SIGNAL DETECTION
Reliable line signaling techniques for the FAA GRN-27[V] and CAT-3 ILS
[AD-A009881] N75-29077
NORSAR phase 3
[AD-A005775] N75-29623
SIGNAL PROCESSING
Improved MTI radar signal processor
[AD-A010478] N75-29075
Digital Doppler processing using Walsh and quantized Fourier transforms
[AD-A006116] N75-29313
Evaluation of algorithms for linear array beamforming on the AN/UYK-17 [XB-1] [V] signal processing element
[AD-A006251] N75-29315
BURP: A bundle repeater and restorer --- a discussion of switching theory and pseudorandom systems in signal processing
[AD-A006354] N75-29330
Acoustic signal processing devices [surface wave transducer study]
[AD-A006257] N75-29335
Method and apparatus for background signal reduction in opto-acoustic absorption measurement
[NASA-CASE-NPO-13683-1] N75-29383
Comparison of orthogonal transforms for teleseismic data
[AD-A006232] N75-29609
NORSAR phase 3
[AD-A005775] N75-29623
High resolution spectral estimates
[AD-A006406] N75-29946
SIGNAL TRANSMISSION
Speech signal processing
[BMFT-FB-T-74-44] N75-29304
SILENCE
The effect of quiet on hearing --- psychoacoustics - noise [sound]
[AD-A006395] N75-29748
SILICON
Silicon star sensor --- for satellite attitude control
[AD-A006482] N75-29402
Silicon ribbon study program --- dendritic crystals for use in solar cells
[NASA-CR-134821] N75-29910
SILICON CARBIDES
Characterization of silicon carbide
[AD-A006409] N75-29932
SILICON ISOTOPES
Silicon-32 fiber sampler --- extraction of cosmogenic silicon from sea water
[AD-A006275] N75-29714
SILICON JUNCTIONS
On the determination of the photo-ionization energy and the concentration of defects created by nuclear radiation in silicon diodes
[FOA-B-30003-A3] N75-29913
SILICON NITRIDES
Process for the preparation of sintered ceramics on a silicon nitride basis
[NASA-TT-F-16439] N75-29262
SILVER ZINC BATTERIES
Studies on pasted silver oxide electrodes suitable for a pile battery
[AD-A006447] N75-29557
SINGLE CRYSTALS
The study of single crystals for space processing and the effect of zero gravity
[NASA-CR-143271] N75-29914
SINTERING
Effect of oxygen impurity on the pressure-sintering of aluminum nitride
[NASA-TT-F-16452] N75-29237
Process for the preparation of sintered ceramics on a silicon nitride basis
[NASA-TT-F-16439] N75-29262
SKIN FRICTION
A hot-wire surface gage for skin friction and separation detection measurements
[NASA-TM-X-62465] N75-29384
SKY WAVES
The estimation of the service areas of medium and long-wave broadcasting stations
[BBC-RD-1975/1] N75-29281
SKYLAB PROGRAM
Premission and postmission simulation studies of the foot-controlled maneuvering unit for Skylab experiment T-020 --- astronaut maneuvering equipment - space environment simulation
[NASA-TN-D-7963] N75-29153
Skylab program payload integration. Skylab film environmental effects
[NASA-TM-X-64951] N75-29387
A summary of Skylab findings of interest to life scientists
N75-29725

Study to define and verify the personal oral hygiene requirements for extended manned space flight: Oral physiology and microbiology in Skylab manned space missions
[NASA-CR-144361] N75-29740

SKYLAB 3
Ground truth data for test sites [SL-3] --- solar radiation and thermal radiation brightness temperature measurements
[NASA-CR-141911] N75-29531

SKYLAB 4
Ground truth data for test sites [SL-4] --- thermal radiation brightness temperature and solar radiation measurments
[NASA-CR-141912] N75-29532

SKYNET SATELLITES
The Skynet 2 attitude sensor prediction and events program WINK 2
[RAE-TR-74091] N75-29147

SLAGS
Effective ways of utilizing synthetic slags in steel making
[AD-A005982] N75-29258

SLEEP
Effects of hypnotic drugs on performance before and after sleep
[NASA-CR-143311] N75-29743

SLENDER WINGS
The dynamic stability derivatives of a slender wing at zero and moderate life. A comparison of theory with free-flight model tests, Mach number equals 0.8 to 2.0
[ARC-CP-1310] N75-29048
A lifting surface theory method for treating swept or slender wings in attached subsonic flow
[ARC-R/M-3760] N75-29053

SMALL PERTURBATION FLOW
Second-order small-perturbation theory for finite wings in incompressible flow --- two dimensional swept wings
[ARC-R/M-3759] N75-29052

SMOG
A spectroscopic study of California smog
[PB-241022/3] N75-29594
Development and utility of reactivity scales from smog chamber data --- hydrocarbons
[PB-241248/4] N75-29598

SMOKE TRAILS
Experimental and flight evaluation of the titanium tetrachloride water methanol system for the production of smoke trails
[AD-A006126] N75-29702

SNOW COVER
Model studies of drifting snow patterns at safeguard facilities in North Dakota
[AD-A006018] N75-29701

SOCIAL FACTORS
Current and future opportunities in aeronautical engineering
N75-29004
The predicament of aeronautical engineering education and what we can do about it
N75-29006

SODIUM
Parametric investigation of the Na-N2O + CO chemical laser
[AD-A006117] N75-29415

SOIL MECHANICS
Load deflection behavior of lime stabilized layers
[AD-A006015] N75-29494

SOIL SCIENCE
The effects of the physical and chemical properties of soils on the spectral reflectance of soils
[NASA-CR-144379] N75-29534

SOILS
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
Recognition map analysis and crop acreage estimation using Skylab EREP data --- Michigan
[E75-10369] N75-29511
Ohio Skylab EREP investigation
[E75-10373] N75-29515
Recognition map analysis and crop acreage estimation
[E75-10375] N75-29517
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Recognition map analysis and crop acreage estimation
[E75-10380] N75-29522

SOLAR ACTIVITY
Solar activity and precipitation within the zones of latitude 0 deg - 40 deg N
N75-29637
Theoretical and experimental studies in ultraviolet solar physics
[NASA-CR-143270] N75-29977
On a comparison between the predicted and the observed values of the different indices of solar activity for the 20th solar cycle
N75-29981

SOLAR ARRAYS
Thermal vacuum acceptance test of no. 2 Hawker Siddeley dynamics low speed mechanism --- solar paddle drive mechanism
[ESRO-ESTL-10] N75-29095
Mathematical modelling of the RAE lightweight flexible solar array
[RAE-TR-74112] N75-29157
Thermal vacuum qualification test of no. 1 Marconi Space and Defence Systems low speed mechanisms --- for geostationary satellite solar paddle
[ESRO-ESTL-11] N75-29451

SOLAR ATMOSPHERE
Photometric research for the K2, 3 chromospheric flocculi
N75-29982

SOLAR CELLS
Long wave sensitivity of solar converters N-CdS-Cu[2-x]S
[AD-A005918] N75-29566
Silicon ribbon study program --- dendritic crystals for use in solar cells
[NASA-CR-134821] N75-29910

SOLAR CYCLES
On a comparison between the predicted and the observed values of the different indices of solar activity for the 20th solar cycle
N75-29981

SOLAR ECLIPSES
Simultaneous observation of TEC from North and South Hemisphere during the 30th June 1973 solar eclipse
[AD-A006201] N75-29983

SOLAR ELECTRIC PROPULSION
Mission roles for the solar electric propulsion stage with the space transportation system
[NASA-CR-120664] N75-29170
Low cost computer subsystem for the Solar Electric Propulsion Stage [SEPS]
[NASA-CR-120671] N75-29174
A numerical simulation for the spiral raising to the 24 hour orbit by a low-thrust space vehicle with Solar Electric Propulsion [SEP] system
[NAL-TR-395] N75-29177

SOLAR ENERGY
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240784/9] N75-29552
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240553/8] N75-29570

SOLAR ENERGY CONVERSION
Solar energy power system
[NASA-CASE-MFS-21628-2] N75-29548

SOLAR FLARES
A laboratory solar flare neutral point experiment
[AD-A005821] N75-29984
Calculations for interpretation of solar vector magnetograph data --- sunspots - spectrum analysis/data correlation
[NASA-CR-120685] N75-29986

SOLAR HEATING
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240784/9] N75-29552
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240553/8] N75-29570

SOLAR PHYSICS
Theoretical and experimental studies in ultraviolet solar physics
[NASA-CR-143270] N75-29977

SOLAR RADIATION
Particulate and solar radiation stable coating for spacecraft
[NASA-CASE-LAR-10805-2] N75-29431
Geophysics and Space data Bulletin. Volume 11, no. 3, third quarter 1974
[AD-A006402] N75-29501
Ground truth data for test sites [SL-3] --- solar radiation and thermal radiation brightness temperature measurements
[NASA-CR-141911] N75-29531
Ground truth data for test sites [SL-4] --- thermal radiation brightness temperature and solar radiation measurments
[NASA-CR-141912] N75-29532
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 1: Reflection indicatrix
N75-29670
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 2: The spectral albedo
N75-29671
Aerosol and water vapour influences on direct solar radiation fluxes in the centre of equatorial Atlantic
N75-29672
Transformation in the atmosphere of solar radiation reflected from the ocean --- statistical correlation
[NASA-TT-F-16487] N75-29979
Spectral structure of the field of solar radiation reflected by the ocean-atmosphere system
[NASA-TT-F-16488] N75-29980

SOLAR WIND
Development of solar wind shock models with tensor plasma pressure for data analysis
[NASA-CR-143301] N75-29978

SOLID LUBRICANTS
The application of the phenomenon of selective transfer to increase the durability of parts in fuel units
[AD-A005975] N75-29445

SOLID PROPELLANT ROCKET ENGINES
Solid rocket motor inspection by acoustical holography techniques
[AD-A006236] N75-29179

SOLID ROCKET PROPELLANTS
Audible and ultrasonic acoustic emissions from composite solid propellants
[AD-A005714] N75-29268

SOLID SURFACES
Bubble nucleation at real surfaces with no pre-existing gaseous phase
[OUEL-1110/74] N75-29279

SOLIDS
Radiation induced electron emission --- from solid materials
[AD-A006396] N75-29930

SONIC BOOMS
Establishing certification/design criteria for advanced supersonic aircraft utilizing acceptance, interference, and annoyance response to simulated sonic booms by persons in their homes
[AD-A009656] N75-29090
Survey of sonic boom phenomena for the non-specialist --- sound wave propagation
[AD-A009663] N75-29113
The effect of sonic boom on the nesting and brood rearing behavior of the eastern wild turkey
[AD-A005986] N75-29730

SOUND PROPAGATION
Survey of sonic boom phenomena for the non-specialist --- sound wave propagation
[AD-A009663] N75-29113
Flow mechanisms and noise in control valves with model tests in the near sonic and supersonic range
[BLL-CE-TRANS-6607-[9022.09]]
N75-29347

SOUND TRANSMISSION
Normal incidence absorption coefficients and acoustic impedances of typical single layer fibrous lining materials --- fibermetals and polyimide laminates
[ESDU-74003] N75-29185

SOUTH DAKOTA
Investigation of relationships between linears, tonal and hazy anomalies, and petroleum production in the Williston Basin: An ERTS approach
[E75-10370] N75-29512
Investigation of relationships between linears, total and hazy areas, and petroleum production in the Williston Basin: An ERTS approach
[E75-10384] N75-29526

SOUTHERN CALIFORNIA
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
Oil-pollution detection and monitoring from space using ERTS-1
[E75-10381] N75-29523

SOYBEANS
Recognition map analysis and crop acreage estimation
[E75-10375] N75-29517
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Recognition map analysis and crop acreage estimation
[E75-10380] N75-29522

SOYUZ SPACECRAFT
Spaceship Soyuz-17 in orbit. TASS Announcement
[BLL-M-23714-[5828.4F]] N75-29139
Soyuz 14: Salyut-3 flight
[NASA-TT-F-16466] N75-29140

SPACE COMMUNICATION
Study of efficient video compression algorithms for space shuttle applications
[NASA-CR-137708] N75-29294

SPACE ENVIRONMENT SIMULATION
Premission and postmission simulation studies of the foot-controlled maneuvering unit for Skylab experiment T-020 --- astronaut maneuvering equipment - space environment simulation
[NASA-TN-D-7963] N75-29153

SPACE EXPLORATION
Robot manipulators --- in space exploration
[NASA-TT-F-16482] N75-29780

SPACE FLIGHT FEEDING
Space shuttle/food system study. Volume 1: Technical volume, oven study
[NASA-CR-144366] N75-29778
Space shuttle/food system study. Volume 2: Supporting appendices, oven study
[NASA-CR-144367] N75-29779

SPACE FLIGHT STRESS
Two men in space --- space flight stress, psychological effects
[NASA-TT-F-16493] N75-29757

Voices in orbit --- speech analysis for monitoring astronaut performance
[NASA-TT-F-16499] N75-29758

SPACE MAINTENANCE
Functional design specification for the problem data system --- space shuttle
[NASA-CR-144358] N75-29943

SPACE MISSIONS
ESRO-4 mission and operational programme
[ESRO-TN-116-ESTEC] N75-29158

SPACE PROGRAMS
Mastery of outer space in the USSR, 1957 - 1967 --- technology assessment/technology transfer
[NASA-TT-F-16516] N75-29144

SPACE RATIONS
Space food preparation and packaging. A menu for cosmonauts and 'space' bread
[NASA-TT-F-16467] N75-29720
Dinner for a cosmonaut --- development of freeze dried foods
[NASA-TT-F-16465] N75-29772
Space shuttle/food system study. Volume 1: Technical volume, oven study
[NASA-CR-144366] N75-29778

SPACE SHUTTLE BOOSTERS
Propulsion technology needs for advanced space transportation systems --- orbit maneuvering engine [space shuttle], space shuttle boosters
[NASA-TM-X-71783] N75-29173

SPACE SHUTTLE ORBITERS
Differential elevon effectiveness lateral control optimization and elevon hinge moment investigation on a 0.015 scale space shuttle orbiter model 49-0 [140A/B/C modified] in the AECD VKF wind tunnel A [0A115]
[NASA-CR-141534] N75-29165
The relative effects of entry parameters on thermal protection system weight --- space shuttle orbiters
[NASA-CR-144386] N75-29166
Developments in convective heat transfer models featuring seamless and selected detail surfaces, employing electroless plating
[NASA-CR-144364] N75-29356
Concept design of the payload handling manipulator system --- space shuttle orbiters
[NASA-TM-X-72447] N75-29773

SPACE SHUTTLES
Users guide for the shuttle mass properties automated system
[NASA-CR-144371] N75-29145
Experiment definition phase shuttle laboratory: LDRL-10.6 experiment
[NASA-CR-144658] N75-29161
Space shuttle electromagnetic environment experiment. Phase A: Definition study
[NASA-CR-143834] N75-29162
Experiment definition phase shuttle laboratory LDRL-10.6 experiment --- applying optical communication
[NASA-CR-144656] N75-29164
Shuttle checkout software system application verification laboratory manual
[NASA-CR-144378] N75-29169
Flame resistant elastomeric polymer development --- for use in space shuttle instrument packaging
[NASA-CR-144362] N75-29264
Design and evaluation of thermodynamic vent/screen baffle cryogenic storage system --- for space shuttles, space tugs, and spacelab
[NASA-CR-134810] N75-29278
Electronically steerable millimeter wave antenna techniques for space shuttle applications
[NASA-CR-143813] N75-29291
Study of efficient video compression algorithms for space shuttle applications
[NASA-CR-137708] N75-29294
Remote sensing over North Merritt Island --- space shuttle runway
[E75-10371] N75-29513
Space shuttle/food system study. Volume 1: Technical volume, oven study
[NASA-CR-144366] N75-29778
Space shuttle/food system study. Volume 2: Supporting appendices, oven study
[NASA-CR-144367] N75-29779
Functional design specification for Stowage List And Hardware Tracking System [SLAHTS] --- space shuttles
[NASA-CR-144368] N75-29942
Functional design specification for the problem data system --- space shuttle
[NASA-CR-144358] N75-29943

SPACE TRANSPORTATION
Mission roles for the solar electric propulsion stage with the space transportation system
[NASA-CR-120664] N75-29170
Propulsion technology needs for advanced space transportation systems --- orbit maneuvering engine [space shuttle], space shuttle boosters
[NASA-TM-X-71783] N75-29173

SPACE TUGS
Design and evaluation of thermodynamic vent/screen baffle cryogenic storage system --- for space shuttles, space tugs, and spacelab
[NASA-CR-134810] N75-29278

SPACECRAFT CONTAMINATION
Evaluation and study of advanced optical contamination, deposition, measurement, and removal techniques --- including computer programs and ultraviolet reflection analysis
[NASA-CR-144376] N75-29135

SPACECRAFT CONTROL
Flight control and the effectiveness of an aviation system
[NASA-TT-F-16262] N75-29126

SPACECRAFT DESIGN
On an airplane in outer space --- technology transfer between aircraft design and spacecraft design
[NASA-TT-F-16423] N75-29087
Automated Mars surface sample return mission concepts for achievement of essential scientific objectives
[NASA-TM-X-3184] N75-29156
Particulate and solar radiation stable coating for spacecraft
[NASA-CASE-LAR-10805-2] N75-29431
Habitability design in Europe's spacelab: A status report
N75-29724

SPACECRAFT DOCKING
Soyuz 14: Salyut-3 flight
[NASA-TT-F-16466] N75-29140
Combined docking and grasping device
[NASA-CASE-MFS-23088-1] N75-29160

SPACECRAFT ENVIRONMENTS
Skylab program payload integration. Skylab film environmental effects
[NASA-TM-X-64951] N75-29387
Current status in aerospace medicine --- conference on habitability of spacecraft environments and environmental control
[AGARD-CP-154] N75-29722
Habitability design in Europe's spacelab: A status report
N75-29724

SPACECRAFT MANEUVERS
Premission and postmission simulation studies of the foot-controlled maneuvering unit for Skylab experiment T-020 --- astronaut maneuvering equipment - space environment simulation
[NASA-TN-D-7963] N75-29153

SPACECRAFT MODELS
Satellite operations model extension --- COS-B closed loop model
[ESS/SS-617] N75-29146

SPACECRAFT POWER SUPPLIES
Optimization of plane fin-tube radiator for spacecraft energy supply
[NASA-TT-F-16473] N75-29171
Solar energy power system
[NASA-CASE-MFS-21628-2] N75-29548
Nickel hydrogen energy storage satellites
[AD-A006427] N75-29567

SPACECRAFT PROPULSION
Power processing for electric propulsion
[NASA-TM-X-71775] N75-29172
Propulsion technology needs for advanced space transportation systems --- orbit maneuvering engine [space shuttle], space shuttle boosters
[NASA-TM-X-71783] N75-29173

SPACECRAFT SHIELDING
The relative effects of entry parameters on thermal protection system weight --- space shuttle orbiters
[NASA-CR-144386] N75-29166

SPACECRAFT STRUCTURES
Vibration damping of satellite structures
[REPT-251-CA/53] N75-29167
Vibration damping of satellite structures. Report on tests
[REPT-828-CA/40] N75-29168
Recent NASA progress in composites --- application to spacecraft and aircraft structures
[NASA-TM-X-72713] N75-29188

SPACECRAFT TRACKING
The deep space network
[NASA-CR-143289] N75-29289
Functional design specification for Stowage List And Hardware Tracking System [SLAHTS] --- space shuttles
[NASA-CR-144368] N75-29942

SPACECRAFT TRAJECTORIES
Calculation of changes in the period of a satellite based on synchronous visual observations --- spacecraft trajectories - orbit calculation
[AD-A006095] N75-29151
A vector-dyadic development of the equations of motion for N-coupled flexible bodies and point masses --- spacecraft trajectories
[NASA-TN-D-8047] N75-29857

SPACELAB
Experiment definition phase shuttle laboratory LDRL-10.6 experiment --- applying optical communication
[NASA-CR-144656] N75-29164
Design and evaluation of thermodynamic vent/screen baffle cryogenic storage system --- for space shuttles, space tugs, and spacelab
[NASA-CR-134810] N75-29278
Habitability design in Europe's spacelab: A status report
N75-29724

SPANISH SAHARA
Identification, tracking, and sources of Saharan dust: An inquiry using SMS
N75-29664

SPECTRAL ENERGY DISTRIBUTION
The spectral balance equation --- determination of stream functions for the geopotential field
[DM-14] N75-29687

SPECTRAL REFLECTANCE
The effects of the physical and chemical properties of soils on the spectral reflectance of soils
[NASA-CR-144379] N75-29934
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 1: Reflection indicatrix
N75-29670
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 2: The spectral albedo
N75-29671
Spectral structure of the field of solar radiation reflected by the ocean-atmosphere system
[NASA-TT-F-16488] N75-29980

SPECTROMETERS
Particulate contamination spectrometer. Volume 1: Technical report
[NASA-CR-144375] N75-29407
High-energy beams and magnetic spectrometers
[ISS-L-74/8] N75-29861

SPECTROSCOPIC ANALYSIS
Modulation spectroscopy of layer semiconductors GaSe and GaTe
[ISS-L-74/2] N75-29911
Free radical OH, a molecule of astrophysical and aeronomic interest --- radio sources [astronomy] - spectroscopic analysis
[NASA-SP-373] N75-29960

SPECTRUM ANALYSIS
Spectral analysis of Doppler MLS video data
[AD-A006436] N75-29072
Computer analysis of the mass spectra of gas mixtures
[AD-A006160] N75-29221
World climate and world food systems 5: The special model; history and present state of the art
[PB-240874/8] N75-29693
Spectroscopy in the sd and fp shells --- gamma ray spectroscopy
N75-29878
Spectroscopy in the rare earth region
N75-29880
High resolution spectral estimates
[AD-A006406] N75-29946
Calculations for interpretation of solar vector magnetograph data --- sunspots - spectrum analysis/data correlation
[NASA-CR-120685] N75-29986

SPEECH RECOGNITION
Speech signal processing
[BMFT-FB-T-74-44] N75-29304
Computational understanding: Analysis of sentences and context
[AD-A005040] N75-29811
Syllable detection in continuous speech
[AD-A005718] N75-29812
A phonological rules system --- computer techniques - speech recognition
[AD-A005826] N75-29813

SPEED REGULATORS
Miniaturized high speed controls for turbine engines fabrication and test
[AD-A006108] N75-29125

SPIN STABILIZATION
Interactions between SAS-C spacecraft nutations and spin-rate control system
[AD-A006115] N75-29152

SPINAL CORD
Effect of sectioning of the spinal cord in the midlumbar portion on heat exchange and development of fever in rabbits
[NASA-TT-F-16496] N75-29731

SPLINE FUNCTIONS
On remainders and the convergence of cardinal spline interpolation for almost periodic functions
[AD-A006544] N75-29825
Spline approximation to the solution of the linear Fredholm integral equation of the second kind
[AD-A006539] N75-29827

SQUID PROJECT
Coupling considerations for squid devices
[AD-A006324] N75-29345
Turbulent mixing in non-reactive and reactive flows
[AD-A006322] N75-29376

STABILITY DERIVATIVES
The dynamic stability derivatives of a slender wing at zero and moderate life. A comparison of theory with free-flight model tests, Mach number equals 0.8 to 2.0
[ARC-CP-1310] N75-29048
Theoretical prediction of airplane stability derivatives at subcritical speeds
[NASA-CR-132681] N75-29089

STABILITY TESTS
Improvement of the acceptance and surveillance control of nitrate ester propellants. Part 3: Compara-

tive investigation of stability tests for nitrate ester propellants
[TL-1974-20-PT-3] N75-29267
STABILIZERS [AGENTS]
Improvement of the acceptance and surveillance control of nitrate ester propellants. Part 3: Comparative investigation of stability tests for nitrate ester propellants
[TL-1974-20-PT-3] N75-29267
STAGNATION POINT
Conical stagnation points in the supersonic flow around slender circular cones at incidence
[VTH-184] N75-29368
STAGNATION PRESSURE
Tests on probes designed to measure stagnation pressure directly in a supersonic stream
[ARC-R/M-3755] N75-29392
STANDARDIZATION
The impact of metrication on the Defense standardization program
[AD-A006038] N75-29280
STANDARDS
Data terminal standards and protocols
[CRC-1275] N75-29298
Protective clothing: Assessment of need, Volume 2
[PB-241168/4] N75-29786
STANDING WAVES
Lagrangian description of steady waves
[BLL-M-23564-[5828.4F]] N75-29860
STATIC STABILITY
Reentry static stability characteristics of a [Model 471] .005479-scale 146-inch solid rocket booster tested in the NASA/MSFC 14 by 14 inch TWT [SA8F]
[NASA-CR-141549] N75-29163
STATISTICAL ANALYSIS
Civil aviation midair collisions analysis: 1972 added to 1964 - 1971 results --- statistical analysis
[AD-A005897] N75-29064
A development and analysis of multiple range techniques for controlling the variability of a process characteristic with a uniform distribution
[AD-A006478] N75-29456
Main statistical characteristics of currents in the northern part of B-scale
N75-29678
On representativity of wave measurements made by Soviet ships during Tropical Experiment-74
N75-29679
Statistics in human engineering --- military flying personnel
[RAE-TR-74166] N75-29782
Optimal linear and nonlinear feature extraction based on the minimization of the increased risk of misclassification --- Bayes theorem - statistical analysis/data processing
[NASA-CR-144385] N75-29821
STATISTICAL CORRELATION
On the effects of thermodynamic conditions on the evolution of convective clouds in the tropical zone of east Atlantic
N75-29660
Transformation in the atmosphere of solar radiation reflected from the ocean --- statistical correlation
[NASA-TT-F-16487] N75-29979
STATISTICAL DECISION THEORY
On the empirical Bayes approach to multiple decision problems
[AD-A006543] N75-29828
STATISTICAL WEATHER FORECASTING
Objective methods of forecasting local surface winds
[BLL-M-23690-[5828.4F]] N75-29632
One feature of long term ocean-atmosphere interaction
[BLL-M-23693-[5828.4F]] N75-29633
STEELS
Electrochemical measurement of carbon potential. Part 4: Studies on some sodium-steel systems at 910K
[RD/B/N-3157] N75-29217
Effective ways of utilizing synthetic slags in steel making
[AD-A005982] N75-29258
Forged metal powder gears --- for automobiles
[AD-A005787] N75-29441
Behavior of four steel lightweight concrete composite beams under long lasting loads
[CRIF-MT-93] N75-29479
STEERABLE ANTENNAS
Electronically steerable millimeter wave antenna techniques for space shuttle applications
[NASA-CR-143813] N75-29291
STEERING
Effect of yaw angle on steering forces for the lunar roving vehicle wheel
[NASA-CR-143290] N75-29976
STEREOPHOTOGRAPHY
Determining the trajectories of multiple objects using stereophotography and photogrammetry
[RAE-TM-IR-148] N75-29391
On the structure of the cumulus clouds at the equator in connection with meteorological conditions according to the stereophotographic measurements on board the R/V Akademik Kurchatov
N75-29656
STERILIZATION
Chemical controls for sterilization in autoclaves --- heat resistance indication for microorganisms
[NASA-TT-F-16478] N75-29718
Chemical controls for dry heat sterilization
[NASA-TT-F-16321] N75-29719
STIFFNESS
Stiffnesses of laminated flat plates
[ESDU-75002] N75-29466
STOCHASTIC PROCESSES
Applications of the PARCOR coefficients for linear prediction of stationary processes --- partial autocorrelation coefficient for digital voice processing
[TB-173] N75-29302
STOICHIOMETRY
Overall reaction rate and stoichiometry for thermal decomposition of hydrazine
N75-29266
STORAGE BATTERIES
Production and engineering methods for Carb-Tek [trade name] batteries in fork lift trucks
[AD-A006548] N75-29554
State standards of the USSR, lead-acid automotive storage batteries GOST 959.0-71
[AD-A006093] N75-29563
Effect of the electrolyte temperature during charging of plates on the characteristics of electrodes and cells of lead acid automotive storage batteries
[AD-A006079] N75-29565
Nickel hydrogen energy storage satellites
[AD-A006427] N75-29567
An automatic charge-discharge device for testing storage batteries
[AD-A005978] N75-29568
Preliminary safety analysis of lithium batteries
[AD-A006149] N75-29569
Assessment of industrial hazardous waste practices, storage and primary batteries industries
[PB-241204/7] N75-29592
STORAGE RINGS [PARTICLE ACCELERATORS]
Operation of the synchrotron radiation center of the University of Wisconsin --- a discussion of storage rings and far ultraviolet radiation
[AD-A005784] N75-29885
STORAGE STABILITY
Technology and current practices for processing, transferring and storing liquefied natural gas
[PB-241048/8] N75-29271
Desert storage test program
[AD-A006103] N75-29454
STORAGE TANKS
Design and evaluation of thermodynamic vent/screen baffle cryogenic storage system --- for space shuttles, space tugs, and spacelab
[NASA-CR-134810] N75-29278
Fracture control method for composite tanks with load sharing liners
[NASA-CR-134758] N75-29449
STOWAGE [ONBOARD EQUIPMENT]
Functional design specification for Stowage List And Hardware Tracking System [SLAHTS] --- space shuttles
[NASA-CR-144368] N75-29942
STRAIN RATE
Characterization of 2014-T651 aluminum alloy --- compression tests performed under various strain rates and stress states
[AD-A006260] N75-29259
Experimental study on preceding viscoelastic strain disturbances: An inverse problem in dynamic fracture
[ISAS-529-VOL-40-NO-9] N75-29477
Fatigue crack propagation in thin sheets of L73 under constant strain amplitude
[ARC-CP-1314] N75-29485
STRATOSPHERE
Meteorological data. Volume 138, no. 2: Daily altitude charts of the 30 millibar level and mean monthly charts for 1973. Parts 3 and 4, 3rd and 4th. Quarters stratosphere working group
N75-29629
STREAM FUNCTIONS [FLUIDS]
The spectral balance equation --- determination of stream functions for the geopotential field
[DM-14] N75-29687
STREAMLINED BODIES
Three-dimensional flow field due to a radial vortex and source line spanning an annulus
[NAL-TR-378T] N75-29354
STRESS ANALYSIS
Stress analysis of laminated flat plates
[ESDU-74039] N75-29467
Strength of axial flow compressor blade roots. Photoelastic stress analysis of the pin joint lug
[NAL-TR-403] N75-29476
The effect of mean stress on the fatigue of aluminum alloys --- notched specimens
[S/T-MEMO-9/74] N75-29482
STRESS CONCENTRATION
Characterization of 2014-T651 aluminum alloy --- compression tests performed under various strain rates and stress states
[AD-A006260] N75-29259
STRESS CORROSION CRACKING
Effects of environment on the mechanical behavior of metals --- prevention of stress corrosion cracking and hydrogen embrittlement
[AD-A006299] N75-29260
STRESS-STRAIN DIAGRAMS
On the complementary energy theorem in nonlinear elasticity theory
[WTHD-72] N75-29478
STRETCHERS
Litter enplaning-deplaning device
[AD-A006137] N75-29754
STRIP MINING
Ohio Skylab EREP investigation
[E75-10365] N75-29507
Ohio Skylab EREP investigation
[E75-10373] N75-29515
STRUCTURAL ANALYSIS
Natural hazards evaluation of existing buildings
[COM-75-10473/7] N75-29492
STRUCTURAL BASINS
Investigation of relationships between linears, total and hazy areas, and petroleum production in the Williston Basin: An ERTS approach
[E75-10384] N75-29526
STRUCTURAL DESIGN CRITERIA
Some trends in aircraft design: Structures
N75-29014
Solar 10 kW turboalternator silent power program
[AD-A006549] N75-29555
STRUCTURAL ENGINEERING
NASA/University Conference on Aeronautics
[NASA-SP-372] N75-29001
Determination of structural engineering properties of incoloy 903 and CTX-1 alloys
[NASA-CR-120673] N75-29247
STRUCTURAL FAILURE
Deformation and failure under multiaxial stresses: A survey of laboratory techniques and experimental data
[ARC-CP-1306] N75-29484
STRUCTURAL MEMBERS
Failsafe/safe-life interface criteria
[AD-A006131] N75-29462
STRUCTURAL STABILITY
Comparative performance of structural layers in pavement systems. Volume 3: Design and construction of MESL
[AD-A005893] N75-29472
Dynamic method of investigating the stability of a compressed rod --- structural stability
[AD-A005965] N75-29499
STRUCTURAL WEIGHT
OPTIM 2: A magic compatible large scale automated, minumum weight design program. Volume 2: Programmers manual
[AD-A006412] N75-29497
STRUTS
Information on the use of data items on struts
[ESDU-01.01.00] N75-29464
STUDENTS
What kind of students should be developed through aeronautical engineering education?
N75-29025
SUBCRITICAL FLOW
Theoretical prediction of airplane stability derivatives at subcritical speeds
[NASA-CR-132681] N75-29089
SUBMARINES
ASR-ORTOLAN seakeeping trials [as build configuration] --- seaworthiness evaluation of monohulled ships
[AD-A006249] N75-29711
SUBSONIC FLOW
A lifting surface theory method for treating swept or slender wings in attached subsonic flow
[ARC-R/M-3760] N75-29053
SUBURBAN AREAS
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240553/8] N75-29570
SULFATES
Sulfate control technology assessment. Phase 1: Literature search and analysis
[PB-240995/1] N75-29589
SULFIDES
Magnetic and electrical properties of novel compounds in the alkaline earth-transition metal-sulfur and selenium systems
[AD-A005723] N75-29918
SULFUR OXIDES
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
Report to Congress on control of sulfur oxides
[PB-241021/5] N75-29597
SULFURIC ACID
Study of the quality of autonomous and separate control of monohydrate concentration and level in sulfuric acid plants
[NASA-TT-F-16491] N75-29214
SUM RULES
The asymptotic behaviour of the Hurst range
[RR-164/PSC/3] N75-29841

SUNSPOTS
Calculations for interpretation of solar vector magnetograph data — sunspots - spectrum analysis/data correlation
[NASA-CR-120685] N75-29986
SUPERCONDUCTORS
Superconducting windings — for marine electric propulsion
[AD-A006476] N75-29337
SUPERCRITICAL FLOW
A finite-difference scheme for computing supercritical flows in arbitrary co-ordinate systems
[ARC-CP-1313] N75-29050
SUPERCRITICAL WINGS
Opportunities for aerodynamic-drag reduction
N75-29016
SUPERSONIC COMBUSTION
The process of ignition and combustion of hydrogen in a supersonic flow
[AD-A006012] N75-29228
SUPERSONIC COMBUSTION RAMJET ENGINES
An improved numerical procedure for the parametric optimization of three dimensional scramjet nozzles — supersonic combustion ramjet engines - computer programs
[NASA-CR-132695] N75-29359
Manual for improved source flow characteristics program — user manuals [computer programs] supersonic combustion ramjet engines - exhaust gases
[NASA-CR-132696] N75-29360
An improved source flow characteristic technique for the analysis of scramjet exhaust flow fields
[NASA-CR-132697] N75-29361
SUPERSONIC FLOW
A form of the supersonic flow equations for an ideal gas
[ARC-R/M-3757] N75-29042
Noise suppression with high Mach number inlets
[NASA-CR-143314] N75-29115
The process of ignition and combustion of hydrogen in a supersonic flow
[AD-A006012] N75-29228
Flow mechanisms and noise in control valves with model tests in the near sonic and supersonic range
[BLL-CE-TRANS-6607-[9022.09]]
N75-29347
Conical stagnation points in the supersonic flow around slender circular cones at incidence
[VTH-184] N75-29368
Measurements at the leeward side of a cone at large incidences in supersonic flow
[VTH-186] N75-29370
Tests on probes designed to measure stagnation pressure directly in a supersonic stream
[ARC-R/M-3755] N75-29392
SUPERSONIC INLETS
Evaluation by step response tests of prototype relief valves designed for YF-12 inlet stability bleed system
[NASA-TM-X-3262] N75-29118
SUPPRESSORS
Study of methods to suppress self-excitation in O-type Traveling Wave Tubes [TWT]
[NASA-TT-F-16479] N75-29292
SURFACE CRACKS
Fracture testing with surface crack specimens — especially the residual tensile strength test
[NASA-TM-X-71772] N75-29473
SURFACE FINISHING
The application of the phenomenon of selective transfer to increase the durability of parts in fuel units
[AD-A005975] N75-29445
SURFACE LAYERS
An analysis of the surface layer meteorological parameters measurements on equator — time series analysis
N75-29643
Variations of temperature, salinity and currents in the mixed layer and the thermocline [preliminary results]
N75-29681
The experiment of investigation of the dynamics of the upper ocean layer at the Equator
N75-29683
Preliminary analysis of ocean internal wave observations by acoustic soundings
N75-29684
SURFACE PROPERTIES
Surface cleaning in thin film technology
[SAND-74-0344] N75-29183
Work function and adsorption properties of yttrium group rare earth metals
[AD-A005979] N75-29922
D-band surface states on wide band gap insulators. A conceptual model for surface states and catalysis on D-band perovskites
[AD-A005783] N75-29933
Study of grain boundary segregation relating to intergranular fracture
[AD-A006422] N75-29934
Interpretation of surface features of Europa obtained from occultations by Io — astronomical observations - Jupiter [planet]
[NASA-CR-143273] N75-29958
SURFACE REACTIONS
High speed reacting and radiating flows — radiative heat transfer - graphite/surface reactions/oxidation - reentry physics
[AD-A006460] N75-29374
Photoelectron emission analysis of surface elements of the International Sun Earth Explorer
[NASA-CR-143811] N75-29916
SURFACE ROUGHNESS
A new concept of modeling the process of heat transfer on surfaces with artificial roughnesses and microfins
[NASA-TT-F-16506] N75-29357
Evaluation of the present theoretical basis for determination of planetary surface properties by earth-based radar
[NASA-TN-D-7889] N75-29965
SURFACE ROUGHNESS EFFECTS
An investigation of electromagnetic wave scattering from rough surfaces, based on a comparison between vectorial and scalar Kirchhoff methods
[FOA-B-20002-E1] N75-29862
SURFACE TEMPERATURE
The cool skin of the ocean — temperature differences between ocean surface and few cm below
N75-29666
Project Stormwater: The collection of bathythermographic data and airborne radiation sea surface temperature measurements in the wake of hurricane Irah
[AD-A005909] N75-29717
SURFACE WATER
Utilization of Skylab [EREP] system for appraising changes in continental migratory bird habitat
[E75-10361] N75-29503
Recognition map analysis and crop acreage estimation using Skylab EREP data — Michigan
[E75-10366] N75-29508
Application of remote sensing to state and regional problems — Mississippi
[E75-10372] N75-29514
SURFACE WAVES
Acoustic signal processing devices [surface wave transducer study]
[AD-A006257] N75-29335
Marine physics: Internal-surface wave interaction and microstructure measurement program
[AD-A005828] N75-29707
Microwave acoustics handbook. Volume 2: Surface wave velocities, numerical data
[AD-A006113] N75-29870
SURVEILLANCE RADAR
Improved MTI radar signal processor
[AD-A010478] N75-29075
SUSPENSION SYSTEMS [VEHICLES]
Tracked levitated research vehicle periodic test summary report: Primary suspension; aeropropelled
[PB-240994/4] N75-29957
SUSPENSIONS
Transport processes of particles in dilute suspensions in turbulent water flow, phase 3
[PB-239790/9] N75-29586
SUSQUEHANNA RIVER BASIN [MD-NY-PA]
Processing ERTS and Aircraft MSS data with the General Electric Image 100 system
[E75-10362] N75-29504
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
SWEPT WINGS
Measurement and analysis of unsteady aerodynamic force for the vertical gust on an airplane model in the NAL gust wind tunnel — swept wing interference tests
[NAL-TR-399] N75-29027
The prediction of boundary-layer behavior and profile drag for infinite yawed wings. Part 2: Flow near a turbulent attachment line
[ARC-CP-1308] N75-29043
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 3: Calculations for a particular wing
[ARC-CP-1309-PT-3] N75-29047
Second-order small-perturbation theory for finite wings in incompressible flow — two dimensional swept wings
[ARC-R/M-3759] N75-29052
A lifting surface theory method for treating swept or slender wings in attached subsonic flow
[ARC-R/M-3760] N75-29053
The effect of a pylon-mounted nacelle on the flutter behaviour of a wing-pylon-nacelle configuration
[NLR-TR-74125-U] N75-29056
SWIRLING
Examination of combustion stability in a swirling flow combustion chamber — small gas turbine engine
N75-29991
SWITCHES
Production engineering measure for high current, fast switching transistors
[AD-A005666] N75-29327
Variable pulse width modulator exploratory development model
[AD-A006258] N75-29334
Short-pulse switches for airborne high-power supplies
[AD-A006107] N75-29340
SWITCHING CIRCUITS
A thyristor dc switch
[AD-A005957] N75-29342
SWITCHING THEORY
BURP: A bundle repeater and restorer — a discussion of switching theory and pseudorandom systems in signal processing
[AD-A006354] N75-29330
SYMPHONIE SATELLITES
Results of irradiation tests on various electronic components
[CNES-NT-11] N75-29325
SYNCHRONOUS METEOROLOGICAL SATELLITE
Identification, tracking, and sources of Saharan dust: An inquiry using SMS
N75-29664
SYNCHROTRON RADIATION
Operation of the synchrotron radiation center of the University of Wisconsin — a discussion of storage rings and far ultraviolet radiation
[AD-A005784] N75-29685
SYNOPTIC METEOROLOGY
Metorological data. Volume 141, no. 9: Results of synoptic services in 1974. Daily and monthly weather maps [surface, 850 millibars, 500 millibars], tables and brief scientific articles, September
N75-29628
SYNTHETIC FIBERS
Development document for effluent limitations guidelines and new source performance standards for the synthetic polymer segment of the plastics and synthetic materials manufacturing point source category
[PB-240862/3] N75-29577
SYNTHETIC RESINS
Effective ways of utilizing synthetic slags in steel making
[AD-A005982] N75-29258
SYSTEM EFFECTIVENESS
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240784/9] N75-29552
SYSTEMS ANALYSIS
Some indicators for inertial navigation systems reliability
[AD-A006439] N75-29085
Approximation of complex aerospace systems by simpler ones
[AD-A006466] N75-29859
SYSTEMS ENGINEERING
What kind of students should be developed through aeronautical engineering education?
N75-29025
Engineering studies in support of the implementation plan for the distress alerting and locating system DALS, volume 1
[AD-A005273] N75-29082
Low cost computer subsystem for the Solar Electric Propulsion Stage [SEPS]
[NASA-CR-120671] N75-29174

T

TABLES [DATA]
Statistical summary of the 1983 Los Angeles enroute center standard traffic model
[AD-A009011] N75-29073
Results of irradiation tests on various electronic components
[CNES-NT-11] N75-29325
Microwave acoustics handbook. Volume 2: Surface wave velocities, numerical data
[AD-A006113] N75-29870
TACAN
Tests with coaxial TACAN antenna at Doppler very high frequency omnirange [VOR]
[AD-A010008] N75-29080
TACAN and ILS station evaluation report, Loring AFB, Maine
[AD-A006416] N75-29084
TAIL ASSEMBLIES
A technique for analyzing the results of a flutter calculation — exemplified for tail assembly with two degrees of freedom
[ARC-R/M-3765] N75-29054
TAILLESS AIRCRAFT
Longitudinal motions of aircraft involving high angles of attack
[ARC-R/M-3753] N75-29094
TANTALUM ALLOYS
Work function of the [100] faces of single crystals of refractory metal alloys
[AD-A005967] N75-29923
TARGET ACQUISITION
Pattern and motion characteristics of visually time-compressed target detection in static noise
[AD-A006384] N75-29307

CARMONETTE. Volume 1. General description --- ground combat simulation, target acquisition, and mathematical models
[AD-A007843] N75-29806

TEA LASERS
Gigawatt CO2 laser for laser-target interaction studies
[DREV-R-4017/75] N75-29411
Passive mode-locking of a large volume TEA-CO2 laser using an unstable resonator configuration
[DREV-R-4016/75] N75-29412

TECHNOLOGICAL FORECASTING
Study plan to identify long term national telecommunications need and priorities applying Delphi techniques [handbook] --- technological forecasting - United States of America
[NASA-CR-143833] N75-29299
Technical progress and industrial development in a developing economy --- urban development
[AD-A005734] N75-29951

TECHNOLOGY ASSESSMENT
Mastery of outer space in the USSR, 1957 - 1967 --- technology assessment/technology transfer
[NASA-TT-F-16516] N75-29144
Data terminal technology, present and future. Volume 1: State-of-the-art
[CRC-1276-1-VOL-1] N75-29296
Data terminal technology, present and future. Volume 2. Technology forecasting and assessment
[CRC-1276-2] N75-29297
Crop identification technology assessment for remote sensing [CITARS]. Volume 6: Data processing at the laboratory for applications of remote sensing
[NASA-CR-144374] N75-29536
Sulfate control technology assessment. Phase 1: Literature search and analysis
[PB-240995/1] N75-29589

TECHNOLOGY TRANSFER
On an airplane in outer space --- technology transfer between aircraft design and spacecraft design
[NASA-TT-F-16423] N75-29087
Mastery of outer space in the USSR, 1957 - 1967 --- technology assessment/technology transfer
[NASA-TT-F-16516] N75-29144
Space life support technology for a modular integrated utility system
N75-29723
Science, technology, and detente --- international cooperation - U.S.S.R., United States of America
[PB-240818/5] N75-29949

TECHNOLOGY UTILIZATION
Bringing remote sensing technology to the user community
[NASA-CR-141931] N75-29529
Design phase of an environmental technology utilization pilot project through the agricultural extension service in Tennessee
[PB-240761/7] N75-29588
Future utilization of space: Silverton Conference on material science and phase transformations in zero-gravity, summary of proceeding
[NASA-CR-141936] N75-29908

TECTONICS
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521

TELECOMMUNICATION
Cost performance satellite design using queueing theory
[NASA-TM-X-71770] N75-29155
Organization and planning of telecommunications enterprises
[JPRS-65331] N75-29295
Study plan to identify long term national telecommunications need and priorities applying Delphi techniques [handbook] --- technological forecasting - United States of America
[NASA-CR-143833] N75-29299
AFBITS experimental equipment evaluations
[AD-A006192] N75-29309

TELEVISION SYSTEMS
Test and evaluation of a remote control and radiofrequency repeater system for televised radar display applications
[AD-786273] N75-29286
Electronic magnification for astronomical camera tubes
[NASA-CR-143827] N75-29961

TELLURIDES
Amorphous semiconductors
[AD-A005831] N75-29931

TEMPERATURE CONTROL
Thermal control of tethered balloon gondolas
[CNES-NT-10] N75-29096
Cryostat system for temperatures on the order of 2 deg K or less
[NASA-CASE-NPO-13459-1] N75-29277

TEMPERATURE EFFECTS
Some unseparated base flows with heat addition
[ARC-R/M-3756] N75-29041
The measurement of the thermal slip of gases
[NASA-TT-F-16476] N75-29352

TEMPERATURE GRADIENTS
Investigation of radiometers. 4. Experimental contributions to the examination of the theories of the common single-plate radiometer
[NASA-TT-F-16480] N75-29385
The cool skin of the ocean --- temperature differences between ocean surface and few cm below
N75-29666

TEMPERATURE INVERSIONS
On the latitudinal variation of the characteristics of the inversion layers in the region of ITCZ in the east Atlantic
N75-29647

TEMPERATURE MEASUREMENT
Investigation of radiometers. 4. Experimental contributions to the examination of the theories of the common single-plate radiometer
[NASA-TT-F-16480] N75-29385
On the wind, temperature, and humidity fields in the vicinity of an east-west line of showers
N75-29662

TEMPERATURE MEASURING INSTRUMENTS
High temperature sensors for Army gas turbine engines
[AD-A005166] N75-29123

TENSILE STRENGTH
Fracture testing with surface crack specimens --- especially the residual tensile strength test
[NASA-TM-X-71772] N75-29473

TENSILE STRESS
Failure modes of angle ply laminates
[AD-A005737] N75-29493

TENSIOMETERS
Hydrostatic pressure equilibrated tensiometer
[AD-A006282] N75-29710

TERMINAL GUIDANCE
Preliminary two-dimensional area navigation terminal simulation
[AD-A006263] N75-29076

TERNARY ALLOYS
Aluminum alloys: Industrial deformable, sintered and light aluminum alloys
[AD-A005984] N75-29255
Investigation of ion implantation as a doping technique for the 3-5 semiconductors and ternary alloy systems
[AD-A006465] N75-29926

TEST EQUIPMENT
Intermittent positive control computer algorithm for test bed experiments --- collision avoidance - aircraft guidance
[AD-A009215] N75-29068
Manufacturing methods and technology program Automated Image Device Evaluator [AIDE]
[AD-A006546] N75-29338

TETHERED BALLOONS
Ship to shore Oregon test series 2
[AD-A006043] N75-29058
Balloon armament test [test plan]
[AD-A006045] N75-29059
Program description. The ARPA/RML atmospheric sciences program
[AD-A006044] N75-29060
Thermal control of tethered balloon gondolas
[CNES-NT-10] N75-29096
Procedure for testing synthetic fiber cables for flexing fatigue under load
[AD-A006042] N75-29189

TETRACHLORIDES
Experimental and flight evaluation of the titanium tetrachloride water methanol system for the production of smoke trails
[AD-A006126] N75-29702

TEXAS
Processing ERTS and Aircraft MSS data with the General Electric Image 100 system
[E75-10362] N75-29504

TEXTBOOKS
A course in practical astrophysics --- textbooks - universities, U.S.S.R.
[NASA-TT-F-15570] N75-29970

TEXTILES
Research, development and application of noncombustible Beta fiber structures --- for Apollo
[NASA-CR-144365] N75-29186

TEXTURES
Chemical, mineralogical and textural systematics of non-mare melt rocks: Implications for lunar impact and volcanic processes
[NASA-CR-143285] N75-29974

THEOREM PROVING
Limit theorems for the [A,B] process
[RR-168/PSC/4] N75-29843

THEOREMS
Primal geometric programs treated by linear programming
[AD-A005902] N75-29801

THERMAL BLOOMING
COAT measurements and analysis
[AD-A006105] N75-29890

THERMAL CONDUCTIVITY
Thermal conductivity of liquid aliphatic hydrocarbons. 1: Alkanes
[ESDU-75003] N75-29193
Thermal conductivity of liquid aromatic compounds containing oxygen
[ESDU-74032] N75-29194
Thermal conductivity of liquid aromatic compounds containing nitrogen
[ESDU-74034] N75-29195
Thermal conductivity of liquid halogenated aromatic hydrocarbons
[ESDU-74014] N75-29198
Thermal conductivity of liquid aromatic hydrocarbons
[ESDU-74007] N75-29199
Thermal conductivity of liquid n-alkyl aldehydes and ketones
[ESDU-71024] N75-29204
Thermal conductivity of liquid branched chain esters of monobasic alkanoic acids
[ESDU-71022] N75-29205
Thermal conductivity of liquid n-alkyl esters of monobasic n-alkanoic acids
[ESDU-71002] N75-29207
Thermal conductivity of liquid monobasic alkanoic acids
[ESDU-72007] N75-29208

THERMAL CONTROL COATINGS
Particulate and solar radiation stable coating for spacecraft
[NASA-CASE-LAR-10805-2] N75-29431

THERMAL CYCLING TESTS
Structure and thermal cycling stability of a hafnium monocarbide reinforced directionally solidified cobalt-base eutectic alloy
[NASA-TM-X-71751] N75-29242

THERMAL DISSOCIATION
Kinetics and mechanism of the thermal decomposition of salts of hydrazonium
[AD-A005994] N75-29223

THERMAL ENERGY
Thermal energy storage systems
[NASA-CASE-MFS-23167-1] N75-29547

THERMAL INSULATION
Thermal control of tethered balloon gondolas
[CNES-NT-10] N75-29096

THERMAL PROTECTION
The relative effects of entry parameters on thermal protection system weight --- space shuttle orbiters
[NASA-CR-144386] N75-29166

THERMAL RADIATION
Ground truth data for test sites [SL-3] --- solar radiation and thermal radiation brightness temperature measurements
[NASA-CR-141911] N75-29531
Ground truth data for test sites [SL-4] --- thermal radiation brightness temperature and solar radiation measurments
[NASA-CR-141912] N75-29532

THERMAL RESISTANCE
Chemical controls for sterilization in autoclaves --- heat resistance indication for microorganisms
[NASA-TT-F-16478] N75-29718

THERMAL VACUUM TESTS
Thermal vacuum acceptance test of no. 2 Hawker Siddeley dynamics low speed mechanism --- solar paddle drive mechanism
[ESRO-ESTL-10] N75-29095
Thermal vacuum qualification test of no. 1 Marconi Space and Defence Systems low speed mechaniams --- for geostationary satellite solar paddle
[ESRO-ESTL-11] N75-29451

THERMOCLINES
Variations of temperature, salinity and currents in the mixed layer and the thermocline [preliminary results]
N75-29681

THERMODYNAMIC CYCLES
Thermodynamic analysis of direct low-temperature cycles
[BLL-RTS-9548] N75-29935

THERMODYNAMIC PROPERTIES
Thermodynamic properties of toluene
[ESDU-74024] N75-29196
Thermodynamic properties of benzene
[ESDU-73009] N75-29200

THERMODYNAMICS
Thermodynamics and kinetics of reactions in protective coating systems
[NASA-CR-143313] N75-29249
Polydichlorophosphazene: Thermomechanical behavior
[AD-A005911] N75-29265
On the effects of thermodynamic conditions on the evolution of convective clouds in the tropical zone of east Atlantic
N75-29660
Polyphosphazenes: Thermomechanical transitions
[AD-A006328] N75-29919

THERMOELECTRIC MATERIALS
Thermoelectric properties of natural lead sulfide and synthetic N-lead sulfide
[AD-A006082] N75-29564

THERMOELECTRICITY
Electrical and thermoemission properties of alloys lanthanum and cerium hexaborides with transition metals
[AD-A005980] N75-29921

THERMOGRAVIMETRY
The development of an automatic multisample isothermal aging apparatus
[AD-A006156] N75-29232
THERMONUCLEAR REACTIONS
Plasma on earth and in space
[NASA-TT-F-16373] N75-29895
THERMOREGULATION
Effect of sectioning of the spinal cord in the midlumbar portion on heat exchange and development of fever in rabbits
[NASA-TT-F-16496] N75-29731
THICKNESS RATIO
Theoretical effect of modifications to the upper surface of two NACA airfoils using smooth polynomial additional thickness distributions which emphasize leading edge profile and which vary linearly at the trailing edge
[NASA-CR-137717] N75-29030
THIN FILMS
Surface cleaning in thin film technology
[SAND-74-0344] N75-29183
A thin film catalytic-non-catalytic heat transfer gauge for shock tube measurements in reacting gases
[AASU-336] N75-29390
Large diameter active mirror with holographic figure sensing --- thin mirror active system
[AD-A006211] N75-29892
THIN PLATES
Fatigue crack propagation in thin sheets of L73 under constant strain amplitude
[ARC-CP-1314] N75-29485
THIN WALLED SHELLS
Response of thin-walled cylinders to aerodynamic excitation, part 1
[TT-7413-PT-1] N75-29480
Response of thin-walled cylinders to aerodynamic excitation, part 2 --- appendices
[TT-7413-PT-2] N75-29481
THREE DIMENSIONAL FLOW
Three-dimensional flow field due to a radial vortex and source line spanning an annulus
[NAL-TR-378T] N75-29354
Three-dimensional inviscid effects in axial flow turbomachinery and limitation of cascade theory
[NAL-TR-379T] N75-29355
Calculation of non-lifting potential flow about arbitrary three dimensional bodies based on doublet distributions
[AD-A005877] N75-29377
THRUST CHAMBERS
Thrust chamber life prediction. Volume 1: Mechanical and physical properties of high performance rocket nozzle materials
[NASA-CR-134806] N75-29238
Development of sputtered techniques for thrust chambers
[NASA-CR-134824] N75-29248
THRUST LOADS
Thrust measurement
[NASA-CASE-XMS-05731] N75-29382
THRUST REVERSAL
Wind tunnel test of model target thrust reversers for the Pratt and Whitney aircraft JT8D-100 series engines installed on a 727-200 airplane
[NASA-CR-134709] N75-29117
THRUST VECTOR CONTROL
Thrust vector control by secondary injection into rocket nozzles
[NAL-TR-409] N75-29178
THYRISTORS
Features of using reversing thyristor excitors with separate control in electric drive systems
[AD-A006088] N75-29332
Thyristor control of an inductive capacitive converter for charging capacitive energy tanks
[AD-A006080] N75-29333
A thyristor dc switch
[AD-A005957] N75-29342
TIME
Identification of continuous time dynamical systems with unknown noise covariance
[AD-A005885] N75-29816
TIME DEPENDENCE
On characteristic time scales of meteorological fields in the tropical Atlantic zone
N75-29645
TIME LAG
Simulation of digital systems consisting of elements with propagation delay time
[NAL-TR-391] N75-29792
Influence of combustion phenomena on the pogo effect --- time delay parameter in combustion chamber transfer function
N75-29989
TIME SERIES ANALYSIS
An analysis of the surface layer meteorological parameters measurements on equator --- time series analysis
N75-29643
High resolution spectral estimates
[AD-A006406] N75-29946
TIME SHARING
A production environment evaluation of interactive programming
[AD-A006502] N75-29795
TITANIUM
Fretting of titanium at temperatures to 650 C in air
[NASA-TN-D-8048] N75-29250
TITANIUM ALLOYS
Crack growth in Ti-8Al-1Mo-1V with real-time and accelerated flight by flight loading
[NASA-TM-X-72754] N75-29092
Determination of structural engineering properties of incoloy 903 and CTX-1 alloys
[NASA-CR-120673] N75-29247
Fatigue strength of the titanium alloys Ti 8Al 1Mo 1V, Ti 5Al 2.5Sn and Ti 6Al 4V at high temperatures --- 246 C and 340 C
[ISD-161] N75-29251
Fatigue crack propagation data for titanium sheet alloys: IMI 318
[NLR-TR-74048-U] N75-29252
Heat treatment of the VT22 alloy
[AD-A006005] N75-29256
TITANIUM COMPOUNDS
Experimental and flight evaluation of the titanium tetrachloride water methanol system for the production of smoke trails
[AD-A006126] N75-29702
TITANIUM OXIDES
The chemical deposition of dispersion coatings with Ni-P and Ni-B matrices. Embedding of oxides: Titanium dioxide
[BLL-LTI-746-01460-[9022.401]] N75-29235
TOKAMAK FUSION REACTORS
Heating and containment of a plasma in a small Tokamak device
[REPT-74-87] N75-29549
TOLUENE
Thermodynamic properties of toluene
[ESDU-74024] N75-29196
TOOLS
A study to determine the adequacy of the tools and equipment used by Air Force women in the craft skills
[AD-A006342] N75-29767
TOPOGRAPHY
Remote sensing over North Merritt Island --- space shuttle runway
[E75-10371] N75-29513
Associative array processing for topographic data reduction
[AD-A006198] N75-29543
Catalogue of geoidal variations for simple seafloor topographic features
[NASA-CR-141400] N75-29706
TORSIONAL VIBRATION
The effect of compressibility on unstalled torsional flutter
[ARC-R/M-3754] N75-29040
Vibrations in centrifugal pump units by external systems
[BLL-CE-TRANS-6643-[9022.09]] N75-29427
TOXIC DISEASES
A structure activity study of oximes aiming at prophylaxis against organophosphates
[CL-1974-23] N75-29744
TOXIC HAZARDS
Feasibility of 5 gpm dynactor/magnetic separator system to treat spilled hazardous materials
[PB-241080/1] N75-29590
TRACE ELEMENTS
Method and apparatus for background signal reduction in opto-acoustic absorption measurement
[NASA-CASE-NPO-13683-1] N75-29383
Removing trace contaminants from sampling cylinders
[AD-A006138] N75-29397
TRACTORS
An improved fifth wheel
[NASA-CASE-FRC-10081-1] N75-29432
TRAFFIC CONTROL
A study of bifurcated routing in a data network and the effect of isarithmic flow control in this context
[NPL-COM-72] N75-29305
TRAILERS
An improved fifth wheel
[NASA-CASE-FRC-10081-1] N75-29432
TRAINING DEVICES
Manipulating the number and type of adaptive variables in training
[AD-A006229] N75-29764
TRAJECTORIES
Extension of the method for predicting six-degree-of-freedom store separation trajectories at speeds up to the critical speed to include a fuselage with noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment --- external stores - attack aircraft
[AD-A005822] N75-29071
TRAJECTORY ANALYSIS
Determining the trajectories of multiple objects using stereophotography and photogrammetry
[RAE-TM-IR-148] N75-29391
A computer simulation of release parameter effects upon bomb impact distributions
[AD-A006347] N75-29844
TRANSFER FUNCTIONS
Influence of combustion phenomena on the pogo effect --- time delay parameter in combustion chamber transfer function
N75-29989
Transfer matrices of hydraulic systems. Theoretical and experimental study --- propellant transfer noting pogo effect
N75-29990
TRANSFER ORBITS
A numerical simulation for the spiral raising to the 24 hour orbit by a low-thrust space vehicle with Solar Electric Propulsion [SEP] system
[NAL-TR-395] N75-29177
TRANSIENT RESPONSE
Stability and transient motion of a hydrodynamic horizontal three-lobe bearing system
N75-29275
A new transient signal analysis unit --- aerodynamic percussion analysis using magnetic disk unit
N75-29994
TRANSISTOR AMPLIFIERS
Computer-aided amplifier design in BASIC
[AD-A006370] N75-29331
TRANSISTORS
Production engineering measure for high current, fast switching transistors
[AD-A005666] N75-29327
Variable pulse width modulator exploratory development model
[AD-A006258] N75-29334
TRANSITION TEMPERATURE
A method of preparing aromatic polyimides having uniquely low softening temperatures
[NASA-CASE-LAR-11828-1] N75-29181
Polyphosphazenes: Thermomechanical transitions
[AD-A006328] N75-29919
TRANSMITTER RECEIVERS
Performance characteristics of the 12 GHz, 200 watt transmitter experiment package for CTS
[NASA-TM-X-71773] N75-29284
TRANSONIC FLOW
A numerical determination of the bow shock wave in transonic axisymmetric flow about blunt bodies
[NASA-TM-X-72448] N75-29033
A finite-difference scheme for computing supercritical flows in arbitrary co-ordinate systems
[ARC-CP-1313] N75-29050
Conservation forms of gas dynamic equations
N75-29993
TRANSONIC WIND TUNNELS
User's guide for a revised computer program to analyze the LRC 16 foot transonic dynamics tunnel active cable mount system --- computer techniques - aircraft models
[NASA-CR-132692] N75-29130
Reentry static stability characteristics of a [Model 471] .005479-scale 146-inch solid rocket booster tested in the NASA/MSFC 14 by 14 inch TWT [SA8F]
[NASA-CR-141549] N75-29163
TRANSPARENCE
Mass-production model of automatic RDV-1 photometer for measuring and recording atmospheric transparency
[AD-A006076] N75-29394
TRANSPORT AIRCRAFT
Vibrations measured in the passenger cabins of two jet transport aircraft
[NASA-TN-D-7923] N75-29037
Baseline measurement of the noise generated by a short-to-medium range jet transport flying standard ILS approaches and level flyovers
[NASA-TM-X-72760] N75-29119
TRANSPORT PROPERTIES
Thermoelectric properties of natural lead sulfide and synthetic N-lead sulfide
[AD-A006082] N75-29564
Preliminary report on determination of fluxes by direct and profile method during intercomparison 2A --- heat flux, water vapor, and transport properties
N75-29669
Wear and interfacial transport of material
[NASA-TM-X-71781] N75-29909
TRAVELING WAVE TUBES
Performance characteristics of the 12 GHz, 200 watt transmitter experiment package for CTS
[NASA-TM-X-71773] N75-29284
Study of methods to suppress self-excitation in O-type Traveling Wave Tubes [TWT]
[NASA-TT-F-16479] N75-29292
TREADMILLS
Treadmill exercise testing at the USAF School of Aerospace Medicine: Physiological responses in aircrewmen and the detection of latent coronary artery disease
[AGARD-AG-210] N75-29736
TREES [MATHEMATICS]
The decision tree approach to classification
[NASA-CR-141930] N75-29528
TREES [PLANTS]
Use of LANDSAT imagery for wildlife habitat mapping in northeast and east central Alaska
[E75-10367] N75-29509

Recognition map analysis and crop acreage estimation using Skylab EREP data — Michigan
[E75-10369] N75-29511
Recognition map analysis and crop acreage estimation
[E75-10375] N75-29517
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525

TRIANGLES
Computation of functions of triangular matrices
[AD-A005916] N75-29838

TROPICAL METEOROLOGY
Preliminary scientific results of the GARP Atlantic tropical experiment, volume 2
[GATE-14-VOL-2] N75-29639
Study of the A- and B-scale disturbances propagating across the African continent
N75-29641
Rapid structural changes in an asymmetrical tropical depression
N75-29661

TROPICAL REGIONS
The role of the tropical zone in processes occuring in the system ocean - atmosphere - continent — heat flow from the tropics to the Eurasian continent
[BLL-M-23692-[5828.4F]] N75-29634
On characteristic time scales of meteorological fields in the tropical Atlantic zone
N75-29645
On modulation interaction of the various scale waves in the Atlantic tropical zone
N75-29646
On the latitudinal variation of the characteristics of the inversion layers in the region of ITCZ in the east Atlantic
N75-29647
Cloud cover dynamics over the tropical Atlantic during the GATE first observing period
N75-29648
Observations on convective clouds over the tropical Atlantic
N75-29653
On the structure and organization of clouds in the GATE area
N75-29655
On the effects of thermodynamic conditions on the evolution of convective clouds in the tropical zone of east Atlantic
N75-29660
On the reality of existence of sporadic large-scale eddy formations in the ocean
N75-29676

TRUCKS
Production and engineering methods for Carb-Tek [trade name] batteries in fork lift trucks
[AD-A006548] N75-29554

TRUSSES
Optimum configuration of truss structures — using the finite element displacement method
[NAL-TR-388T] N75-29471

TUBES
Propagation of the flame within a narrow tube
[NAL-TR-394] N75-29212

TUNGSTEN ALLOYS
Work function of the [100] faces of single crystals of refractory metal alloys
[AD-A005967] N75-29923

TURBINE BLADES
Experimental verification of film-cooling concepts on a turbine vane
[NASA-TM-X-71777] N75-29107
Calculation of aircraft engine turbines. [Gasdynamic calculation: Blade profiling]
[NASA-TT-F-16367] N75-29120
Optimal control concepts in the design of turbine blades and blades
N75-29274
The impact between a liquid drop and an elastic half-space
[PB-241155/1] N75-29378

TURBINE WHEELS
Optimal control concepts in the design of turbine blades and blades
N75-29274

TURBOCOMPRESSORS
Strength of axial flow compressor blade roots. Photoelastic stress analysis of the pin joint lug
[NAL-TR-403] N75-29476

TURBOFAN ENGINES
Thrust/drag analysis for a front fan nacelle having two separate co-axial exhaust streams — for turbofan engines
[ARC-CP-1311] N75-29049
Application of real-time engine simulations to the development of propulsion system controls
[NASA-TM-X-71764] N75-29108
Wind tunnel test of model target thrust reversers for the Pratt and Whitney aircraft JT8D-100 series engines installed on a 727-200 airplane
[NASA-CR-134709] N75-29117

TURBOFANS
Preliminary design study of a quiet, high flow fan [QHF] stage — turbofans - quiet engine program
[NASA-CR-134780] N75-29433

TURBOGENERATORS
The 100 kW experimental wind turbine generator project
[NASA-TM-X-71758] N75-29546
Solar 10 kW turboalternator silent power program
[AD-A006549] N75-29555

TURBOJET ENGINES
Application of real-time engine simulations to the development of propulsion system controls
[NASA-TM-X-71764] N75-29108

TURBOMACHINERY
Three-dimensional inviscid effects in axial flow turbomachinery and limitation of cascade theory
[NAL-TR-379T] N75-29355

TURBULENCE
Turbulent characteristic measurements in the marine boundary layer during GATE
N75-29667

TURBULENCE EFFECTS
Effort of spanwise variation of turbulence on the normal acceleration of airplanes with small span relative to turbulence scale
[NASA-TM-X-72748] N75-29036
A direct time history study of the response of an airplane to nonstationary turbulence
[AD-A006159] N75-29102
Theoretical aspects of the fundamental velocity of flames in the turbulent regime
[NASA-TT-F-16511] N75-29215

TURBULENT BOUNDARY LAYER
The prediction of boundary-layer behavior and profile drag for infinite yawed wings. Part 2: Flow near a turbulent attachment line
[ARC-CP-1308] N75-29043
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 1: A method of calculation
[ARC-CP-1307-PT-1] N75-29046
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 3: Calculations for a particular wing
[ARC-CP-1309-PT-3] N75-29047

TURBULENT DIFFUSION
On turbulent diffusion in coaxial jets of dissimilar gases with pressure gradient
[NAL-TR-392T] N75-29350

TURBULENT FLOW
Analysis of an axisymmetrical turbulent pulsating jet
[VKI-TN-104] N75-29045
Investigation of the flows flowing from swirlers, 1
[NAL-TR-376] N75-29105
Numerical integration of the momentum-integral equations and application of the results to the flow between rotating disks
[VTH-183] N75-29369
Transport processes of particles in dilute suspensions in turbulent water flow, phase 3
[PB-239790/9] N75-29586
Apparatus and programs for digital analysis of fluctuating quantities in turbulent flow
[IC-AERO-74-09] N75-29793

TURBULENT JETS
Nonlinear spatial wave development in an axisymmetrical turbulent jet
[NRC-14756] N75-29364

TURBULENT MIXING
Turbulent mixing in non-reactive and reactive flows
[AD-A006322] N75-29376

TURBULENT WAKES
On wake vortex alleviation
N75-29010
Vortex-related accidents over the ten year period 1964 - 1973
[AD-A010111] N75-29065
A numerical study on the effects of viscosity on the performance of CO2 gasdynamic laser — using laminar boundary layer model and turbulent wake model
[ISAS-528-VOL-40-NO-8] N75-29408

TURKEYS
The effect of sonic boom on the nesting and brood rearing behavior of the eastern wild turkey
[AD-A005986] N75-29730

TWO DIMENSIONAL BODIES
Transonic data memorandum: Second-order method for estimating the subcritical pressure distribution on a two-dimensional aerofoil in compressible inviscid flow
[ESDU-72025] N75-29029
Second-order small-perturbation theory for finite wings in incompressible flow — two dimensional swept wings
[ARC-R/M-3759] N75-29052
Crossflow in two-dimensional asymmetric nozzles
[NASA-TN-D-7999] N75-29365

TWO DIMENSIONAL FLOW
A numerical method for the solution of the two-dimensional steady laminar boundary layer equations
[VKI-TN-103] N75-29044

U

U.S.S.R.
Mastery of outer space in the USSR, 1957 - 1967 — technology assessment/technology transfer
[NASA-TT-F-16516] N75-29144
Newest methods of air distribution in conditioning systems on naval transport vessels
[NASA-TT-F-16498] N75-29775
Science, technology, and detente — international cooperation - U.S.S.R., United States of America
[PB-240818/5] N75-29949
A course in practical astrophysics — textbooks - universities, U.S.S.R.
[NASA-TT-F-15570] N75-29970

U.S.S.R. SPACE PROGRAM
Spaceship Soyuz-17 in orbit. TASS Announcement
[BLL-M-23714-[5828.4F]] N75-29139
Stellar diary
[NASA-TT-F-16376] N75-29142
A month on Salyut-4
[NASA-TT-F-16419] N75-29143

UBV SPECTRA
UBV photometry of asteroid 433 Eros
[NASA-CR-143316] N75-29963

UH-1 HELICOPTER
Major Item Special Study [MISS], UH-1H 90 degrees T/R gear box — value engineering - UH-1 helicopter
[AD-A006506] N75-29098

UHURU SATELLITE
Small astronomy satellite-A, Uhuru data analysis
[NASA-CR-144660] N75-29964

ULTRAHIGH FREQUENCIES
An analysis of aircraft L-band beacon antenna patterns
[AD-A005569] N75-29287
Low-level modulator and isolator-limiter-detector development — for use at ultrahigh frequencies
[AD-A006296] N75-29308

ULTRASONIC TESTS
The feasibility of ranking material fracture toughness by ultrasonic attenuation measurements
[NASA-TM-X-71769] N75-29241

ULTRAVIOLET RADIATION
Valence band density of states of amorphous and trigonal selenium determined by X-ray and UV photoemission
[AD-A006168] N75-29190
Theoretical and experimental studies in ultraviolet solar physics
[NASA-CR-143270] N75-29977

ULTRAVIOLET REFLECTION
Evaluation and study of advanced optical contamination, deposition, measurement, and removal techniques — including computer programs and ultraviolet reflection analysis
[NASA-CR-144376] N75-29135

UNDERGROUND EXPLOSIONS
Project T/3703 — evaluation of seismograph systems for the detection of underground nuclear explosions
[AD-A006437] N75-29613
Identification of earthquakes and underground explosions
[AD-A006467] N75-29621
Source studies in the near and far field, part A
[AD-A005786] N75-29622
Seismic discrimination
[AD-A006194] N75-29624

UNDERWATER ACOUSTICS
Preliminary analysis of ocean internal wave observations by acoustic soundings
N75-29684

UNITED STATES OF AMERICA
Study plan to identify long term national telecommunications need and priorities applying Delphi techniques [handbook] — technological forecasting - United States of America
[NASA-CR-143833] N75-29299
Science, technology, and detente — international cooperation - U.S.S.R., United States of America
[PB-240818/5] N75-29949

UNIVERSITIES
The predicament of aeronautical engineering education and what we can do about it
N75-29005
The predicament of aeronautical engineering education and what we can do about it
N75-29006
The ME/DE degree at the University of Kansas
N75-29017
A proposed university/industry/government cooperative aero educational program
N75-29018
University/government/industry relations in aeronautics
N75-29019
University research in aeronautics
N75-29020
General aviation's future need for research
N75-29021

University research in aeronautics N75-29022
Curriculum for modern aeronautics N75-29023
A course in practical astrophysics — textbooks - universities, U.S.S.R.
[NASA-TT-F-15570] N75-29970

UNSTEADY FLOW
Analysis of an axisymmetrical turbulent pulsating jet
[VKI-TN-104] N75-29045

UNSWEPT WINGS
Effort of spanwise variation of turbulence on the normal acceleration of airplanes with small span relative to turbulence scale
[NASA-TM-X-72748] N75-29036

UPPER ATMOSPHERE
The quality of upper air observations in the GATE B-area — using Omega and VLF navigation systems and balloon sounding N75-29652
Preliminary analysis of a selective sample of GATE ship and aircraft data — upper atmosphere temperature and humidity N75-29659

URBAN DEVELOPMENT
Ohio Skylab EREP investigation
[E75-10365] N75-29507
Ohio Skylab EREP investigation
[E75-10373] N75-29515
Technical progress and industrial development in a developing economy — urban development
[AD-A005734] N75-29951

URBAN PLANNING
Application of the helicopter KA-26 to large-scale aerial photography
[AD-A005950] N75-29393
Allocation methodology. Distance determinations and population catchment determinations, and their applicability to practical planning — urban planning - information systems
[NASA-TT-F-16495] N75-29856

USER MANUALS (COMPUTER PROGRAMS)
User's guide for a revised computer program to analyze the LRC 16 foot transonic dynamics tunnel active cable mount system — computer techniques - aircraft models
[NASA-CR-132692] N75-29130
Users guide for the shuttle mass properties automated system
[NASA-CR-144371] N75-29145
Shuttle checkout software system application verification laboratory manual
[NASA-CR-144378] N75-29169
Manual for improved source flow characteristics program — user manuals (computer programs) supersonic combustion ramjet engines - exhaust gases
[NASA-CR-132696] N75-29360
An incore finite element program for research and teaching purposes — matrix displacement method
[ISD-162] N75-29486
ACS batch processing system. Volume 2: User's guide
[AD-A005305] N75-29538
CAMAC: Group manipulation system
[PB-240495/2] N75-29798
CARMONETTE. Volume 2. Data preparation — ground combat simulation
[AD-A007844] N75-29807
CARMONETTE. Volume 3. Technical documentation — user manual for combat simulation
[AD-A007845] N75-29808

USER REQUIREMENTS
Passenger conveyor economics: Costs, capacity and user benefits
[TT-7409] N75-29069
Bringing remote sensing technology to the user community
[NASA-CR-141931] N75-29529

UTAH
A regional land use survey based on remote sensing and other data — Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona
[E75-10374] N75-29516

UTILITIES
Analysis of large power systems N75-29850

V

V/STOL AIRCRAFT
Potential and viscous flow prediction in V/STOL propulsion system inlets
[NASA-TM-X-71776] N75-29110
Digital simulation of V/STOL aircraft for autopilot research N75-29853

VACUUM DEPOSITION
Evaluation and study of advanced optical contamination, deposition, measurement, and removal techniques — including computer programs and ultraviolet reflection analysis
[NASA-CR-144376] N75-29135

VALENCE
Valence band density of states of amorphous and trigonal selenium determined by X-ray and UV photoemission
[AD-A006168] N75-29190

VALLEYS
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs — Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain
[E75-10382] N75-29524

VALUE ENGINEERING
Major Item Special Study (MISS), UH-1H 90 degrees T/R gear box — value engineering - UH-1 helicopter
[AD-A006506] N75-29098

VAN DE GRAAFF ACCELERATORS
Results of irradiation tests on various electronic components
[CNES-NT-11] N75-29325

VAPOR DEPOSITION
Vapor deposition apparatus — semiconductors and gallium arsenides
[NASA-CASE-HQN-10462] N75-29192
Studies related to the surfaces of the moon and planets — a discussion of vapor deposition and glasses of lunar composition
[NASA-CR-143268] N75-29937

VAPOR PRESSURE
Vapour pressures and critical points of pure substances. 4: C1 to C20 alcohols
[ESDU-74023] N75-29197
Vapour pressures of pure substances up to their critical points. 2: C2 to C6 alkenes (monoolefines)
[ESDU-73008] N75-29201
Vapour pressures of pure substances up to their critical points. 3: C6 to C10 alkylbenzenes
[ESDU-73029] N75-29202
Vapour pressures of pure substances up to their critical points. 1: C1 to C8 alkanes
[ESDU-72028] N75-29210

VARIABILITY
Manipulating the number and type of adaptive variables in training
[AD-A006229] N75-29764

VARIANCE (STATISTICS)
Monte Carlo variance reduction study — radiation effects - material absorption/nuclear radiation
[NASA-CR-120672] N75-29818

VARIATIONAL PRINCIPLES
On the complementary energy theorem in nonlinear elasticity theory
[WTHD-72] N75-29478

VECTORS (MATHEMATICS)
A vector-dyadic development of the equations of motion for N-coupled flexible bodies and point masses — spacecraft trajectories
[NASA-TN-D-8047] N75-29857

VEGETATION
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs — Sierra-Lahontan and Colorado Plateaus, Northern Great Valley [CA], and Louisiana Coastal Plain
[E75-10382] N75-29524
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525

VEHICLE WHEELS
An improved fifth wheel
[NASA-CASE-FRC-10081-1] N75-29432
Wheel/track technologies — rapid transit system research
[BMFT-FB-T-74-42] N75-29954
Effect of yaw angle on steering forces for the lunar roving vehicle wheel
[NASA-CR-143290] N75-29976

VEHICULAR TRACKS
Wheel/track technologies — rapid transit system research
[BMFT-FB-T-74-42] N75-29954

VELOCITY DISTRIBUTION
Theoretical aspects of the fundamental velocity of flames in the turbulent regime
[NASA-TT-F-16511] N75-29215
Ocean currents observed by NOAA ship Oceanographer during GATE N75-29677

VELOCITY MEASUREMENT
Determining the trajectories of multiple objects using stereophotography and photogrammetry
[RAE-TM-IR-148] N75-29391
The Rayleigh velocity for a slightly anisotropic, orthotropic solid
[AD-A006148] N75-29920

VERTEBRATES
On the otoliths and their origin
[NASA-TT-F-16470] N75-29741

VERTICAL DISTRIBUTION
Preliminary report on determination of fluxes by direct and profile method during intercomparison 2A — heat flux, water vapor, and transport properties N75-29669
Fluctuations in the vertical structure of the Atlantic equatorial undercurrent N75-29675
Vertical structure of hemispheric temperature spectral components
[DM-13] N75-29686

VERTICAL TAKEOFF AIRCRAFT
Summary of model VTOL lift fan tests conducted at NASA Lewis Research Center
[NASA-TM-X-71778] N75-29106

VERY LOW FREQUENCIES
Evaluation of a very low frequency navigation system
[AD-A005043] N75-29074
A study of energetic particle precipitation effects associated with discrete VLF signals, and of the mechanism of VLF emission generation — electromagnetic radiation - magnetosphere
[AD-A006464] N75-29620
The quality of upper air observations in the GATE B-area — using Omega and VLF navigation systems and balloon sounding N75-29652

VHF OMNIRANGE NAVIGATION
Tests with coaxial TACAN antenna at Doppler very high frequency omnirange [VOR]
[AD-A010008] N75-29080

VIBRATION
The Shock and Vibration Digest, Volume 7, No. 5, May 1975
[AD-A010036/2] N75-29272
Forced extensional vibrations of plates
[AD-A006150] N75-29491
Activities of the Institute of Sound and Vibration Research N75-29995

VIBRATION DAMPING
Vibration damping of satellite structures
[REPT-251-CA/53] N75-29167
Vibration damping of satellite structures. Report on tests
[REPT-828-CA/40] N75-29168

VIBRATION EFFECTS
Vibration as an artificially created human factor of the environment
[NASA-TT-F-16475] N75-29776

VIBRATION ISOLATORS
Parameter optimization of vibration absorbers and shock isolators by root-locus technique N75-29276

VIBRATION MEASUREMENT
Vibrations measured in the passenger cabins of two jet transport aircraft
[NASA-TN-D-7923] N75-29037

VIBRATION TESTS
Fatigue damage equivalence of field and simulated vibrational environments
[AD-A006226] N75-29453

VIBRATIONAL SPECTRA
The Shock and Vibration Digest, Volume 7, No. 2, February 1975 — finite element method
[AD-A006665/4] N75-29465

VIBRATIONAL STRESS
Cable strumming experiments
[AD-A005894] N75-29715

VIDEO DATA
Spectral analysis of Doppler MLS video data
[AD-A006436] N75-29072
Digital video: Differential coding of PAL colour signals using same-line and two-dimensional prediction
[BBC-RD-1975/20] N75-29282
Study of efficient video compression algorithms for space shuttle applications
[NASA-CR-137708] N75-29294
A comparison of infrared imagery and video pictures in the estimation of daily rainfall from satellite data
[COM-75-10435/6] N75-29698

VIDEO EQUIPMENT
Some preliminary experiments in the use of a programmable videotape recorder as an automated history-taking device in a chest clinic
[NPL-COM-73] N75-29745

VIGNETTING
Image processing and data reduction of Apollo low light level photographs
[NASA-CR-144659] N75-29389

VIKING ORBITER SPACECRAFT
The deep space network
[NASA-CR-143289] N75-29289

VIRGINIA
Oil-pollution detection and monitoring from space using ERTS-1
[E75-10381] N75-29523

VIRUSES
Synthesis of N-acetylneuraminic acid derivatives and studies of their interaction with vibrio cholerae neuraminidase
[FOA-B-40018-B6] N75-29182

VISCOELASTICITY
Experimental study on preceding viscoelastic strain disturbances: An inverse problem in dynamic fracture
[ISAS-529-VOL-40-NO-9] N75-29477

VISCOSITY
A guide to the viscosity of liquid petroleum products
[ESDU-71003] N75-29346
A numerical study on the effects of viscosity on the performance of CO2 gasdynamic laser --- using laminar boundary layer model and turbulent wake model
[ISAS-528-VOL-40-NO-8] N75-29408

VISCOUS FLOW
Potential and viscous flow prediction in V/STOL propulsion system inlets
[NASA-TM-X-71776] N75-29110
Application of the finite element method to fluid problems --- potential and viscous flow
[BLL-RTS-9414] N75-29348

VISIBILITY
On the methodology of measuring visual range for aviation purposes
[BLL-M-23694-[5828.4F]] N75-29631
Visibility on the Atlantic Ocean and the North Sea
[PHL-1974-32] N75-29688

VISUAL PERCEPTION
On the methodology of measuring visual range for aviation purposes
[BLL-M-23694-[5828.4F]] N75-29631

VISUAL TASKS
Pattern and motion characteristics of visually time-compressed target detection in static noise
[AD-A006384] N75-29307

VOICE COMMUNICATION
Simulation model for New York air traffic control communications
[AD-A006426] N75-29083
Electromagnetic interference measurements in electronic voice switching equipment areas
[AD-A008925] N75-29288

VOICE DATA PROCESSING
Applications of the PARCOR coefficients for linear prediction of stationary processes --- partial autocorrelation coefficient for digital voice processing
[TB-173] N75-29302
Speech signal processing
[BMFT-FB-T-74-44] N75-29304
Voices in orbit --- speech analysis for monitoring astronaut performance
[NASA-TT-F-16499] N75-29758

VOLCANOLOGY
Chemical, mineralogical and textural systematics of non-mare melt rocks: Implications for lunar impact and volcanic processes
[NASA-CR-143285] N75-29974

VOLTMETERS
Coupling considerations for squid devices
[AD-A006324] N75-29345

VORTEX BREAKDOWN
The effect of wing dihedral and section suction distribution on vortex bursting
[NASA-TM-X-72745] N75-29091

VORTICES
On wake vortex alleviation
N75-29010
Unsteady vortex lattice techniques applied to wake formation and performance of the statically thrusting propeller
[NASA-CR-132686] N75-29031
Vortex-related accidents over the ten year period 1964 - 1973
[AD-A010111] N75-29065
Three-dimensional flow field due to a radial vortex and source line spanning an annulus
[NAL-TR-378T] N75-29354

W

WABASH RIVER BASIN [IL-IN-OH]
Study of the utilization of EREP data from the Wabash River Basin --- Lake Monroe and Ft. Wayne, Indiana
[E75-10377] N75-29519

WALKING
Preliminary research on body displacement during lunar walking
N75-29726
Behavioural observations of passengers boarding a slow speed conveyor
[TT-7411] N75-29759

WALSH FUNCTION
Digital Doppler processing using Walsh and quantized Fourier transforms
[AD-A006116] N75-29313

WAR GAMES
CARMONETTE. Volume 1. General description --- ground combat simulation, target acquisition, and mathematical models
[AD-A007843] N75-29806
CARMONETTE. Volume 2. Data preparation --- ground combat simulation
[AD-A007844] N75-29807
CARMONETTE. Volume 3. Technical documentation --- user manual for combat simulation
[AD-A007845] N75-29808

WARNING SYSTEMS
Results of an aircraft visibility questionnaire concerned with the estimated benefits of airborne proximity warning indicator systems
[AD-A009884] N75-29061

WASTE DISPOSAL
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
A computer program for evaluation of solid waste resource recovery
[AD-A006356] N75-29583
Characterization of vessel wastes in Duluth-Superior Harbor
[PB-241081/9] N75-29585
The effects of air and water pollution controls on solid waste generation, 1971 - 1985. Executive summary
[PB-240739/2] N75-29600

WASTE UTILIZATION
A computer program for evaluation of solid waste resource recovery
[AD-A006356] N75-29583

WASTES
Assessment of industrial hazardous waste practices, storage and primary batteries industries
[PB-241204/7] N75-29592

WATER POLLUTION
Interfacing a 24-point analog recorder to a computer controlled telemetry line --- for water pollution monitoring
[PB-241086/8] N75-29403
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
Oil-pollution detection and monitoring from space using ERTS-1
[E75-10381] N75-29523
Legal aspects of phosphate mining in North Carolina
[COM-75-10504/9] N75-29540
Characterization of vessel wastes in Duluth-Superior Harbor
[PB-241081/9] N75-29585
Transport processes of particles in dilute suspensions in turbulent water flow, phase 3
[PB-239790/9] N75-29586
Feasibility of 5 gpm dynactor/magnetic separator system to treat spilled hazardous materials
[PB-241080/1] N75-29590
The macroeconomic impacts of federal pollution control programs
[PB-240979/5] N75-29591
Report to the Congress on ocean pollution, overfishing, and offshore development; July 1973 through June 1974
[COM-75-10509/8] N75-29593
The effects of air and water pollution controls on solid waste generation, 1971 - 1985. Executive summary
[PB-240739/2] N75-29600

WATER TEMPERATURE
The cool skin of the ocean --- temperature differences between ocean surface and few cm below
N75-29666
Anomalous variations in temperature-salinity relationships at GATE station 7
N75-29680
Variations of temperature, salinity and currents in the mixed layer and the thermocline [preliminary results]
N75-29681

WATER TREATMENT
Removal of manganese from mine drainage by ozone and chlorine
[PB-241143/7] N75-29541
Feasibility of 5 gpm dynactor/magnetic separator system to treat spilled hazardous materials
[PB-241080/1] N75-29590
A cosmic model of the biosphere
[NASA-TT-F-16460] N75-29968

WATER VAPOR
Water and vinyl trichlorosilane vapor interactions with E-glass fibers
[AD-A005088] N75-29218
Study of water absorption lines in the near infrared
[AD-A005636] N75-29234
Preliminary report on determination of fluxes by direct and profile method during intercomparison 2A --- heat flux, water vapor, and transport properties
N75-29669
Aerosol and water vapour influences on direct solar radiation fluxes in the centre of equatorial Atlantic
N75-29672
Experiments of nonequilibrium, nonstationary expansion of water vapour/carrier gas mixture in a shock tube
[UTIAS-195] N75-29863
Experimental studies of the collisional excitation of infrared active vibrational stretch modes in CO2 and H2O with an intersecting, hyperthermal molecular beam apparatus, volume 1
[AD-A006237] N75-29886

WATER WAVES
On representativity of wave measurements made by Soviet ships during Tropical Experiment-74
N75-29679
Preliminary analysis of ocean internal wave observations by acoustic soundings
N75-29684

WATERSHEDS
Ohio Skylab EREP investigation
[E75-10373] N75-29515

WAVE EQUATIONS
Nonlinear spatial wave development in an axisymmetrical turbulent jet
[NRC-14756] N75-29364

WAVE INTERACTION
On modulation interaction of the various scale waves in the Atlantic tropical zone
N75-29646
Marine physics: Internal-surface wave interaction and microstructure measurement program
[AD-A005828] N75-29707

WAVE PROPAGATION
Survey of sonic boom phenomena for the non-specialist --- sound wave propagation
[AD-A009663] N75-29113
ATS-6 millimeter wavelength propagation experiment
[NASA-CR-143832] N75-29290
Study of the A- and B-scale disturbances propagating across the African continent
N75-29641
Lagrangian description of steady waves
[BLL-M-23564-[5828.4F]] N75-29860
Dispersion relation for electron waves propagating in an isotropic plasma containing Maxwellian and suprathermal electrons
N75-29881
A large quiescent magnetized plasma for wave studies
[AD-A006461] N75-29900
ATS-6 millimeter wavelength propagation experiment --- a data acquisition system
[NASA-CR-143829] N75-29944

WAVE SCATTERING
An investigation of electromagnetic wave scattering from rough surfaces, based on a comparison between vectorial and scalar Kirchhoff methods
[FOA-B-20002-E1] N75-29862

WEAPON SYSTEMS
A GASP 4 simulation of tactical air interdiction using a choice of weapons loads and continuously changing weather conditions
[AD-A006349] N75-29417

WEAR
Wear and interfacial transport of material
[NASA-TM-X-71781] N75-29909

WEATHER
A review of clutter, 1974
[RRE-TN-783] N75-29300

WEATHER STATIONS
WMO operations manual for sampling and analysis techniques for chemical constituents in air and precipitation. Part 1: The minimum programme at regional air-pollution stations. Part 2: Guidelines for baseline stations and regional stations with extended programmes
[WMO-299] N75-29574

WEIGHT INDICATORS
Improved seagoing scale
[AD-A006321] N75-29713

WEIGHT MEASUREMENT
Improved seagoing scale
[AD-A006321] N75-29713

WEIGHTING FUNCTIONS
Comparison of some classes of MTI filters for a 3-pulse canceller with staggered PRF
[PHL-1974-38] N75-29323

WEIGHTLESSNESS
Future utilization of space: Silverton Conference on material science and phase transformations in zero-gravity, summary of proceeding
[NASA-CR-141936] N75-29908
The study of single crystals for space processing and the effect of zero gravity
[NASA-CR-143271] N75-29914

WELD STRENGTH
Fatigue behavior of welded reinforcement in reinforced concrete beams
[PB-240367/3] N75-29500

WETTING
An investigation of the influence of the wet surface area of a positive electrode on the energy conversion efficiency during the electrical explosion of conductors
[AD-A005971] N75-29343

WHIPLASH INJURIES
Basic biomechanical properties of the human neck related to lateral hyperflexion injury
[PB-241246/8] N75-29747

WHISKER COMPOSITES
New machinery and materials --- a discussion of reinforcing fibers, whisker composites, nickel alloys, and laser applications
[AD-A005953] N75-29438
WHITE NOISE
Identification of continuous time dynamical systems with unknown noise covariance
[AD-A005885] N75-29816
WIDTH
Width measurements on short tracks of cosmic ray nuclei in nuclear emulsion
[LUIP-CR-74-13] N75-29987
WILDLIFE
Use of LANDSAT imagery for wildlife habitat mapping in northeast and east central Alaska
[E75-10367] N75-29509
Application of remote sensing to state and regional problems --- Mississippi
[E75-10372] N75-29514
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525
WIND [METEOROLOGY]
A statistical verification of a ten year time series of computed surface wind conditions over the North Pacific and North Atlantic Oceans
[AD-A005869] N75-29704
WIND MEASUREMENT
On the wind, temperature, and humidity fields in the vicinity of an east-west line of showers
N75-29662
WIND PRESSURE
Wind tunnel generation of sinusoidal lateral and longitudinal gusts by circulation of twin parallel airfoils
[NASA-CR-137547] N75-29351
WIND TUNNEL APPARATUS
Wind tunnel generation of sinusoidal lateral and longitudinal gusts by circulation of twin parallel airfoils
[NASA-CR-137547] N75-29351
WIND TUNNEL MODELS
Wind tunnel model deformation measuring system
[AD-A006390] N75-29138
WIND TUNNEL STABILITY TESTS
Reentry static stability characteristics of a [Model 471] .005479-scale 146-inch solid rocket booster tested in the NASA/MSFC 14 by 14 inch TWT [SA8F]
[NASA-CR-141549] N75-29163
WIND TUNNEL TESTS
Computational aerodynamics
N75-29013
Full-scale aerodynamic and engine testing of the APL Symdel Mk 6 RPV
[AD-A006283] N75-29099
Summary of model VTOL lift fan tests conducted at NASA Lewis Research Center
[NASA-TM-X-71778] N75-29106
Wind tunnel test of model target thrust reversers for the Pratt and Whitney aircraft JT8D-100 series engines installed on a 727-200 airplane
[NASA-CR-134709] N75-29117
Differential elevon effectiveness lateral control optimization and elevon hinge moment investigation on a 0.015 scale space shuttle orbiter model 49-0 [140A/B/C modified] in the AECD VKF wind tunnel A [0A115]
[NASA-CR-141534] N75-29165
Experimentally determined aeroacoustic performance and control of several sonic inlets
[NASA-TM-X-71767] N75-29353
WIND TUNNELS
Wind tunnel generation of sinusoidal lateral and longitudinal gusts by circulation of twin parallel airfoils
[NASA-CR-137547] N75-29351
WINDPOWER UTILIZATION
The 100 kW experimental wind turbine generator project
[NASA-TM-X-71758] N75-29546
WINDPOWERED GENERATORS
The 100 kW experimental wind turbine generator project
[NASA-TM-X-71758] N75-29546
WING LOADING
A lifting surface theory method for treating swept or slender wings in attached subsonic flow
[ARC-R/M-3760] N75-29053
WING PROFILES
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 1: A method of calculation
[ARC-CP-1307-PT-1] N75-29046
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 3: Calculations for a particular wing
[ARC-CP-1309-PT-3] N75-29047
WING SPAN
The effect of wing dihedral and section suction distribution on vortex bursting
[NASA-TM-X-72745] N75-29091
WINGS
Shear and moment response of the airplane wing to nonstationary turbulence
[NAL-TR-404T] N75-29032
WINTER
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
WORK FUNCTIONS
Work function and adsorption properties of yttrium group rare earth metals
[AD-A005979] N75-29922
Work function of the {100} faces of single crystals of refractory metal alloys
[AD-A005967] N75-29923
WYOMING
A regional land use survey based on remote sensing and other data --- Montana, Wyoming, Colorado, New Mexico, Utah, and Arizona
[E75-10374] N75-29516

X

X RAY ANALYSIS
Study of zirconium-niobium-nickel system by local X-ray analysis
[NASA-TT-F-16474] N75-29246
X RAY SOURCES
Why are there so few X-ray stars?
[NASA-TT-F-16296] N75-29971
X RAY SPECTRA
Calculations of X-ray Breusstrahlung spectra and scintillator detector yields for relativistic electron energies from 10 keV to 10 MeV
[AD-A006552] N75-29902
X RAYS
Valence band density of states of amorphous and trigonal selenium determined by X-ray and UV photoemission
[AD-A006168] N75-29190
Low fluence calculation of photoelectron flux densities outside an emitting sphere
[AD-A005825] N75-29866
Small astronomy satellite-A, Uhuru data analysis
[NASA-CR-144660] N75-29964

Y

YAW
The prediction of boundary-layer behavior and profile drag for infinite yawed wings. Part 2: Flow near a turbulent attachment line
[ARC-CP-1308] N75-29043
Effect of yaw angle on steering forces for the lunar roving vehicle wheel
[NASA-CR-143290] N75-29976
YEAST
Resistance of Nadsoniella nigra var. hesuelica to the action of a high vacuum
[NASA-TT-F-16503] N75-29732
YF-12 AIRCRAFT
A throat-bypass stability system for a YF-12 aircraft research inlet using self-acting mechanical valves
[NASA-TM-X-71779] N75-29128

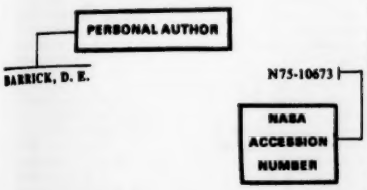
Z

ZERO LIFT
The dynamic stability derivatives of a slender wing at zero and moderate life. A comparison of theory with free-flight model tests, Mach number equals 0.8 to 2.0
[ARC-CP-1310] N75-29048
ZINC
Effects of environment on the mechanical behavior of metals --- prevention of stress corrosion cracking and hydrogen embrittlement
[AD-A006299] N75-29260
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
ZIRCONIUM ALLOYS
Study of zirconium-niobium-nickel system by local X-ray analysis
[NASA-TT-F-16474] N75-29246

PERSONAL AUTHOR INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 13 NUMBER 20

TYPICAL PERSONAL AUTHOR INDEX LISTING



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ABDULLAEV, G. B. N75-29564
ABELNOUR, T. A. N75-29747
ABEYTA, R. D. N75-29456
ABRAHAM-SHRAUNER, B. N75-29978
ABRAMOV, R. V. N75-29643
N75-29644
ACHESON, D. T. N75-29652
ADAMS, N. J. N75-29543
ADAMS, O. E., JR. N75-29276
ADLER, R. W. N75-29339
ADNASHKIN, V. N. N75-29673
AFANASYEV, G. T. N75-29635
AGRAWAL, K. M. N75-29375
AHTYE, W. F. N75-29067
AIBA, T. N75-29105
AICHER, W. N75-29251
AICHI N75-29262
ALBERCA, L. F. N75-29610
ALBONE, C. M. N75-29050
ALBRECHT, P. R. N75-29443
ALBRECHT, W. P. N75-29432
ALET, I. N75-29096
ALIMPIEV, A. I. N75-29229
ALLAN, D. N75-29271
ALLEE, D. J. N75-29544
ALLEN, T. H. N75-29135
ALLVEY, G. W. N75-29557
ALMOND, M. A. N75-29540
ALTARELLI, G. N75-29912
ALVORD, G. C. N75-29389
ANASTASSIADIS, M. A. N75-29983
ANDERSON, J. B. N75-29886
ANDERSON, J. H. N75-29525
ANDREYEVSKIY, V. V. N75-29126
ANDRIYENKO, L. N75-29968
ANISIMOV, A. I. N75-29731
ANTSIPOVICH, V. A. N75-29650
AOKI, M. N75-29855
APPERT, K. N75-29823
APPLETON, D. A. N75-29451
ARGYRIS, J. H. N75-29251
ARNOLDI, D. N75-29872
ARNUSH, D. N75-29612
ASADA, H. N75-29789
ASHBROOK, R. L. N75-29243
ASHFORD, N. N75-29759
ASHIHARA, O. N75-29871
ASHLEY, H. N75-29022
ASLANOV, S. K. N75-29224
ASTIGUETA, J. M. N75-29409
ATALLAH, S. N75-29271
ATHA, J. N75-29759
ATHANS, M. N75-29849
ATKINS, A. G. N75-29474
ATKINSON, C. H. N75-29614
AZUMA, H. N75-29176

B

BABKO, L. M. N75-29463
BACHMANOV, A. A. N75-29140
BAER, F. N75-29686
N75-29687
BAGCHI, A. N75-29816
BAILEY, R. G. N75-29417
BAKER, K. N75-29969
BAKKER, P. G. N75-29368
BALD, W. B. N75-29279
BALDIS, H. A. N75-29411
BALDOCK, J. C. A. N75-29054
BALDRIDGE, P. N75-29507
N75-29515
BALDWIN, G. C. N75-29424
BALTA, J. A. R. N75-29339
BALUSEK, R. A. N75-29746
BAMBERGER, E. N. N75-29429
N75-29435
BANCROFT, G. A. N75-29450
BANNINK, W. J. N75-29368
BARBERO, P. N75-29130
BARGERON, C. B. N75-29415
BARNETT, J. A. N75-29813
BARNETT, T. L. N75-29602
BARNHART, W. L. N75-29785
N75-29786
BARON, J. R. N75-29374
BARONE, M. R. N75-29500
BARRERE, M. N75-29989
BARRETT, A. H. N75-29626
BARRY, J. W. N75-29401
BARSTOW, D. N75-29799
BARTHA, R. N75-29733
BASS, S. C. N75-29077
BATTIS, J. C. N75-29622
BAUER, M. E. N75-29536
BAUER, P. H. N75-29351
BAUM, J. K. N75-29747
BAUM, K. N75-29227
BAUM, P. J. N75-29984
BAUMGARDNER, M. F. N75-29534
BAUMGARTNER, S. L. N75-29814
BEAN, A. K. N75-29583
BEAN, B. R. N75-29700
BEARD, C. D. N75-29227
BECKER, D. L. N75-29577
BEEBE, R. F. N75-29958
BEERBOWER, A. N75-29459
BEGUHN, A. A. N75-29433
BELL, C. P. N75-29281
BELL, V. L. N75-29181
N75-29263
BELL, W. E. N75-29080
BELTER, S. N75-29077
BELYAEV, A. F. N75-29213
BEN-ISRAEL, A. N75-29800
N75-29801
BEN-TAL, A. N75-29800
N75-29801
BENHAIM, N. N75-29836
BENIGNUS, G. N75-29797
BENIGNUS, V. A. N75-29820
BENNETT, G. N75-29820
BENOIT, A. N75-29101
BENSCHOP, H. P. N75-29991
BENSON, R. C. N75-29744
BERENDS, F. N75-29415
BERGER, D. N75-29744
BERGERON, L. N75-29823
BERGSTROEM, J. N75-29689
BERL, W. G. N75-29898
BERLIN, P. J. N75-29124
BERRY, B. J. L. N75-29158
BERRY, W. G., JR. N75-29584
BERTEUSSEN, K. A. N75-29844
BESPALOV, D. P. N75-29623
BESSEY, R. L. N75-29651
BEURER, P. N75-29127
BEVAN, B. N75-29427
BHATNAGAR, S. C. N75-29506
BHATTACHARYYA, S. P. N75-29839
BILL, R. C. N75-29819
BINCK, H. J. N75-29250
BIORDI, J. C. N75-29791
BIXLER, E. O. N75-29219
BIXLER, W. D. N75-29743
BLAKE, R. L. N75-29449
BLIND, J. A. N75-29545
BLINOV, V. I. N75-29454
BLOCK, G. F. N75-29222
BLODGETT, M. L. N75-29689
BLUMENTHAL, D. I. N75-29716
BOATMAN, T. W. N75-29617
BOBOLEV, V. K. N75-29943
N75-29213
BOCHKOVSKI, V. S. N75-29463
BOEKEMEIR, V. N75-29358
BOGDAN, L. N75-29138
BOHLEY, P. N75-29326
BOLALEK, P. J. N75-29767
BOLLARD, R. J. H. N75-29006
BOLLINGER, J. N. N75-29753
BONDARENKO, N. A. N75-29463
BONDARENKO, V. P. N75-29921
BORDEN, F. Y. N75-29504
BORDT, E. F. N75-29565
BORISENKOV, E. P. N75-29601
BOROVIKOV, A. M. N75-29654
N75-29663
BOSTROEM, R. N75-29607
BOUCHILLON, C. W. N75-29514
BOUTTES, J. N75-29989
BOWELL, E. N75-29963
BOWER, R. E. N75-29016
BOWIN, C. N75-29706
BOWMAN, B. M. N75-29747
BOYD, B. A. N75-29407
BRACKETT, J. W. N75-29790
BRADDOCK, W. F. N75-29163
BRADFORD, J. N. N75-29930
BRADSHAW, P. N75-29793
BRANSCOMB, L. M. N75-29949
BRANTLEY, L. W. N75-29547
BRATENAHL, A. N75-29984
BRENNAN, L. E. N75-29306
BRETON, F. N75-29689
BRIEN, D. E. N75-29512
BRINDLEY, A. E. N75-29072
BRIZENDINE, J. C. N75-29004
BROADBENT, E. G. N75-29041
BRODSKY, R. F. N75-29018
BROEK, D. N75-29487
BROOKS, G. W. N75-29014
BROSH, A. N75-29384
BROWN, A. H. N75-29386
BROWN, D. C. N75-29159
BROWN, J. N75-29082
BROWN, L. R. N75-29740
BROWN, T. L. N75-29750
BRUNER, A. N75-29751
BRYSON, A. E., JR. N75-29005
BRYSON, R. A. N75-29690
N75-29691
BUCKLEY, D. H. N75-29909
BUDELMAN, F. C. N75-29537
N75-29538
N75-29539
BUEHLER, B. G. N75-29123
BULLIS, W. M. N75-29329
BULLOCK, B. N75-29891
BUMTZ, G. D. N75-29585
BUNT, A. A. N75-29761
BUNTING, P. M. N75-29069
BURCH, J. L. N75-29160
BURES, M. N75-29898
BURLUTSKY, R. F. N75-29642
N75-29649
BURNELL, D. G. N75-29125
BURNS, J. W. N75-29727
BURTON, R. R. N75-29727
BYRN, N. R. N75-29818

C

CABIBBO, N. N75-29912
CADY, E. C. N75-29278
CAHAN, B. D. N75-29257
CAIKAN, A. M. N75-29231
CAIRNS, J. L. N75-29707
CALHOUN, L. C. N75-29072
CALKINS, D. J. N75-29701
CAMAC, M. N75-29886
CAMAIONI, J. E. N75-29572

CAMERON, A. G. N75-29079
CANN, G. L. N75-29903
CANNON, J. P. N75-29500
CAPOCACCIA, R. N75-29941
CARDONA, M. N75-29190
CARLSON, J. N. N75-29436
CARPENTER, L. K. N75-29636
CARPENTER, S. H. N75-29446
CARR-HILL, G. A. N75-29047
CARRIGAN, A. L. N75-29501
CARTER, B. N75-29514
CARTER, E. C. N75-29114
CARY, T. K. N75-29536
CASANA, J. N75-29592
CASTELLANI, A. N75-29726
CATHERINES, J. J. N75-29037
CERNUHIN, M. S. N75-29601
CHAFFIN, D. B. N75-29747
CHAMPION, M. C. N75-29781
CHAN, Y. Y. N75-29364
CHANDLER, R. A. N75-29317
CHANDRASEKHARA, B. C. N75-29369
CHANEY, L. W. N75-29594
CHAPMAN, D. K. N75-29386
CHAPMAN, D. R. N75-29013
CHARKOV, V. P. N75-29336
CHARNES, A. N75-29802
CHATURANI, P. N75-29375
CHEN, C. H. N75-29609
CHEN, C. L. N75-29131
CHEN, F. Y. N75-29276
CHEN, S. C. N75-29077
CHEN, Y. N. N75-29427
CHERNG, J. G. N75-29115
CHI, D. N. H. N75-29379
CHIKIROVA, G. A. N75-29697
CHIN, J. N75-29130
CHINNERY, M. A. N75-29624
CHINZEI, N. N75-29178
CHONG, C. Y. N75-29854
CHRISTOPULOS, J. A. N75-29569
CHRISTOUX, C. N75-29994
CHU, K. C. N75-29851
CHUIKO, S. V. N75-29213
CICOLANI, L. S. N75-29853
CIESLA, W. M. N75-29401
CIRILLO, R. R. N75-29572
CLAASSEN, J. H. N75-29345
CLARK, L. R. N75-29115
CLEVENGER, W. B., JR. N75-29109
CLEVER, W. N75-29089
CLOUTIER, J. R. N75-29815
COBB, E. S. N75-29186
COHEN, A. S. N75-29587
COHEN, M. H. N75-29967
COHEN, S. N75-29073
COLE, G. L. N75-29128
COLE, M. A. N75-29125
COLLEY, D. V. N75-29396
COLLIN, G. N75-29991
COLLINGBOURNE, J. N75-29094
COLLINGS, P. S. N75-29841
N75-29843
COLLINS, D. N75-29179
COLOMBANT, D. G. N75-29422
COLONNA, G. S. N75-29806
N75-29807
COLTON, D. N75-29829
N75-29831
N75-29833
COMPTON, W. A. N75-29123
CONNELLY, T. M. N75-29919
CONNELLY, T. M., JR. N75-29265
CONNORS, W. C. N75-29454
CONRAD, E. W. N75-29008
CONWAY, E. D. N75-29870
COOK, G. E. N75-29149
COOK, J. L. N75-29447
COOLEY, R. L. N75-29542
COON, G. W. N75-29320
COOPER, S. N75-29520
COSEL, R. M. N75-29133
N75-29136
COUNSELMAN, C. C., III N75-29962
COVERT, E. E. N75-29024
COX, C. S. N75-29707
COY, J. J. N75-29434
CRAIG, J. I. N75-29268
CRAMER, R. H. N75-29099
CRAVEN, J. D. N75-29604
CRAWFORD, M. L. N75-29404
CRIMBRING, W. N75-29076
CROSBY, E. L., JR. N75-29189
CROWDER, B. L. N75-29926
CULVER, C. G. N75-29492
CURTIS, H. B. N75-29896
CZERNY, M. N75-29352

D

DACOSTA, G. N75-29409
DAHL, A. O. N75-29386
DAMOS, D. L. N75-29764
DARNELL, W. L. N75-29156
DASH, S. N75-29359
N75-29361
N75-29679
DAVIDAN, I. N. N75-29536
DAVIS, B. J. N75-29548
DAVIS, B. K. N75-29715
DAVIS, N. B. N75-29137
DAVIS, R. N75-29326
DAVIS, R. J. N75-29529
DAVIS, S. M. N75-29147
DAVISON, G. J. N75-29558
DAY, R. L. N75-29733
DEAN-RAYMOND, D. N75-29896
DECKER, A. J. N75-29821
DEFIGUEIREDO, R. J. P. N75-29827
N75-29499
DEINEKO, K. S. N75-29744
DEJONG, L. P. A. N75-29549
DEKLUIVER, H. N75-29433
DELANEY, R. A. N75-29361
DELGUIDICE, P. N75-29359
DELGUIDICE, P. D. N75-29360
N75-29870
DELMONICO, R. T. N75-29874
DENISIK, S. A. N75-29142
DENISOV, N. N. N75-29638
DEPENA, R. G. N75-29274
DESILVA, B. M. E. N75-29311
DESIZE, L. K. N75-29215
DESOETE, G. N75-29282
DEVEREUX, V. G. N75-29952
DEVINE, P. R. N75-29106
DIEDRICH, J. H. N75-29543
DIEHL, M. D. N75-29324
DIJK, W. A. N75-29071
DILLENIUS, M. F. E. N75-29602
DILLINGER, A. E. N75-29186
DILLON, J. J. N75-29135
DILLOW, C. F. N75-29273
DIMAGGIO, F. L. N75-29598
DIMITRIADES, B. N75-29311
DION, A. R. N75-29230
DOCTOR, I. S. N75-29127
DODGE, F. T. N75-29300
DODSWORTH, E. J. N75-29753
DOLLE, W. C. N75-29850
DOMMEL, H. W. N75-29286
DONG, J. G. N75-29989
DORDAIN, J. J. N75-29990
N75-29817
DOROHOV, V. O. N75-29271
DRAKE, E. N75-29859
DRENICK, R. F. N75-29310
DRUFUCA, G. N75-29075
DRURY, W. H. N75-29138
DRZEWIECKI, R. F. N75-29020
DUBERG, J. E. N75-29903
DUCATI, A. N75-29580
DUEWER, D. L. N75-29066
DUFF, W. G. N75-29950
DUKE, W. M. N75-29910
DUNCAN, C. S. N75-29668
DUNCKEL, M. N75-29986
DUNN, A. R. N75-29101
DUNN, J. N75-29089
DUNN, K. N75-29460
DUNN, P. E., JR. N75-29450
DUNSMORE, I. R. N75-29138
DURYEA, G. R. N75-29118
DUSTIN, M. O. N75-29128
N75-29750
DYER, D. R.

E

EAST, R. A. N75-29390
ECKHARDT, D. H. N75-29159
EDWARDS, G. F. N75-29048
N75-29051
EGORIKHIN, V. D. N75-29683
EISNER, M. N75-29908
EKBLAD, R. B. N75-29401
EKSTROM, J. L. N75-29313
ELAGINA, L. G. N75-29669
ELBINGER, W. H. N75-29461
ELGHOBASHI, S. N75-29211
ELLIOTT, S. S. N75-29328
ELSKAMP, D. M. W. N75-29744
EMMANUEL, C. G. N75-29700
ENDO, M. N75-29122
ERICKSON, J. D. N75-29508
N75-29511
N75-29517
N75-29518
N75-29522
ERICKSON, J. M. N75-29512
N75-29526
ERNICK, F. G. N75-29327
ESPARZA, V. N75-29165
ESPOSITO, J. J. N75-29238
EVANS, C. R. N75-29745
EVANS, W. J. N75-29484

F

FAIR, W. N75-29834
FALKENHAGEN, G. L. N75-29275
FALKOVICH, A. I. N75-29650
FANTE, R. L. N75-29413
N75-29888
FARMER, W. M. N75-29425
FAUST, J. W., JR. N75-29932
FEDORUS, G. A. N75-29566
FEEN, M. M. N75-29314
FEIGELSON, E. M. N75-29672
FELDER, W., II N75-29709
FELLBAUM, K. N75-29304
FENN, J. B. N75-29886
FEURZEIG, W. N75-29797
FIALA, J. L. N75-29284
FIALKO, G. M. N75-29214
FILIPPI, C. A. N75-29410
FINDAKLY, T. N75-29077
FINKE, R. C. N75-29172
FISCH, K. R. N75-29232
FISCHER, G. N75-29957
FISHELSON, G. N75-29587
FISHER, J. N75-29709
FITZNER, R. E. N75-29502
FLETCHER, J. C. N75-29002
FLETCHER, J. L. N75-29112
FOLEY, E. W. N75-29711
FOLLANSBEE, W. A. N75-29698
FORREST, L. A., JR. N75-29162
FOURNIER, G. N75-29406
FOUST, D. R. N75-29747
FOX, D. F. N75-29100
FRAME, E. A. N75-29440
FRANK, L. A. N75-29604
FRASER, K. F. N75-29111
FRAUNFELDER, M. F., JR. N75-29419
FREDERICKS, R. W. N75-29612
FREEMAN, W. J., JR. N75-29939
FRIDLYANDER, I. N. N75-29235
FRIDMAN, G. K. N75-29421
FRIED, B. D. N75-29612
FRIICHTENICHT, J. F. N75-29906
FRISCH, H. P. N75-29857
FRITZ, E. L. N75-29510
FROELICHER, V. F. N75-29736
FROLOV, K. V. N75-29776
FROSCHER, J. N. N75-29315
FRYE, D. E. N75-29433
FU, K. S. N75-29812
FUJAROS, R. G. N75-29296
N75-29297
N75-29298
FUJIMORI, Y. N75-29032
N75-29475

G

GAFFNEY, F. A. N75-29100
GAITHER, B. N75-29089
GALDON, E. N75-29610
GALUSHKO, V. V. N75-29645
N75-29646
N75-29667
GANT, G. D. N75-29172
GAPOSCHKIN, E. M. N75-29535
GARDNER, J. L. N75-29587
GAUNTNER, J. W. N75-29107
GAWRILOV, G. N75-29235
GAY, B. W., JR. N75-29594
GEIDEMAN, W. A., JR. N75-29318
GEKELMAN, W. N75-29900
GELBMAN, A. A. N75-29256
GELMAN, M. V. N75-29342
GERHART, G. R. N75-29920
GERLACH, W. N75-29385
GERTHEISS, G. N75-29304
GIANNINI, G. M. N75-29426
GIBSON, R. S. N75-29756
GIFFORD, L. N., JR. N75-29261
GILBERT, J. N75-29412
GILBERT, R. P. N75-29839
GILL, J. F. N75-29795
GILLESPIE, D. T. N75-29837
GILLHAM, J. K. N75-29265
N75-29919
GILLIES, J. N75-29095
GILMER, D. S. N75-29503
GILMER, R. O. N75-29700
GITELZON, I. N75-29606
GLADDEN, H. J. N75-29107
GLICK, D. D., N75-29749
GLINCHUK, K. D. N75-29929
GLOSS, B. B. N75-29091
GLOVER, K. E. N75-29153
GOBER, R. N75-29074
GODVOD, V. E. N75-29648
GOLDEN, J. F. N75-29068
GOLDFARB, I. J. N75-29221
GOLDMAN, G. C. N75-29523

GOLDMAN, N. M. N75-29809
GOLDSTEIN, M. N75-29717
GOLOVANOV, Y. N75-29757
GOODING, R. H. N75-29150
GOODWIN, F. K. N75-29071
GOPALACHARYULU, S. N75-29822
GOPHER, D. N75-29764
N75-29765
GORDON, R. N75-29712
GOROSHCHENKO, L. B. N75-29126
GOROSHKO, O. A. N75-29463
GORYSHIN, V. I. N75-29394
GORYSIN, V. I. N75-29631
GOTT, J. N75-29482
GOUSIE, A. A. N75-29754
GRAHAM, W. N75-29061
GRAKAUSKAS, V. N75-29227
GRAKLANOFF, G. J. N75-29537
N75-29538
N75-29539
GRANDOLFO, M. N75-29911
GRASSL, H. N75-29666
GRAVES, G. B., JR. N75-29011
GRAY, W. M. N75-29659
GREEN, A. J. N75-29976
GREEN, C. N75-29799
GREEN, J. A. S. N75-29260
GREEN, S. J. N75-29259
GREENBLATT, C. N75-29077
GREENWOOD, G. H. N75-29051
GREENWOOD, R. F. N75-29402
GREGG, M. C. N75-29707
GREGORY, J. W. N75-29173
GREKOV, S. P. N75-29336
GRIGORYEV, A. A. N75-29533
GRIM, B. S. N75-29401
GRIMMEISS, H. G. N75-29913
GRINNELL, W. T. N75-29309
GROBMAN, J. S. N75-29009
GROLL, A. N75-29632
GROSE, P. L. N75-29680
GRUBER, R. N75-29823
N75-29824
GRUMBLATT, A. G., JR. N75-29767
GUARINO, C. R. N75-29066
GUBAREV, A. N75-29143
GUMM, B. S. N75-29973
GUNN, W. J. N75-29112
GUPTA, B. N75-29249
GUPTA, V. P. N75-29065
GURTISEN, J. M. N75-29502
GWYTHER, J. R. N75-29217

H

HABER, F. N75-29162
HADIGEORGE, G. N75-29139
HAKKANSSON, H. N75-29913
HAGER, P. N75-29062
HAGOPIAN, J. B. N75-29955
HAGUE, D. S. N75-29030
HAJELA, D. P. N75-29972
HALITOV, M. N. N75-29428
HALL, F. F. N75-29665
HALL, G. F. N75-29031
HALL, T. A. N75-29060
HALLOCK, Z. R. N75-29675
HAM, N. D. N75-29351
HAMBLY, D. N75-29117
HAMIL, R. G. N75-29145
HAMMITT, G. M., II N75-29472
HANBY, W. N75-29602
HANSEN, I. G. N75-29284
HANSEN, J. R. N75-29961
HANST, P. L. N75-29594
HAPKE, B. N75-29937
HARNED, M. N75-29021
HARRIES, W. L. N75-29894
HARRIS, J. C. N75-29514
HART, G. C. N75-29492
HASHIN, Z. N75-29493
HASSE, L. N75-29668
N75-29669
HASTINGS, E. C., JR. N75-29119
HAWKINS, N. M. N75-29739
HAWKINS, W. M. N75-29007
HAYASHI, R. M. N75-29557
HAYDEN, B. N75-29709
HAYES, J. F. N75-29768
HECHT, R. J. N75-29248
HEIN, G. F. N75-29155
HEINEMANN, K. N75-29915
HEINRICH, H. G. N75-29057
HEINRICH, O. N75-29347
HELDENFELS, R. R. N75-29188
HELLIWELL, R. A. N75-29620
HELLSTEN, T. N75-29899
HEROLD, W. N75-29283
HERRIN, E. N75-29621
HERRON, B. G. N75-29172
HERZOG, A. D. N75-29958
HETTEL, H. J. N75-29638
HETTNER, G. N75-29352
HEWES, D. E. N75-29153
HIDEYUKI
HIGGINS, F. B., JR.
HILBORN, R. B., JR.
HILL, M. L.
HILL, M. T.
HILL, T. W.
HILTON, P. D.
HINCKLEY, R.
HINZPETER, H.
HIRASAKI, F. N.
HIRASAWA, S.
HITZFELDER, S. J.
HO, Y. C.
HOBBS, R.
HOBDELL, M. R.
HODGE, D. B.
HOELJER, S.
HOLLOWAY, R. B.
HOLMQUIST, L.
HOLST, T. L.
HOOPER, A. J.
HORKANS, J.
HORVATH, R.
HOUBOLT, J. C.
HOUWINK, R.
HOWARD, J. C.
HOWARD, N. M.
HOWARTH, J. T.
HOZAWA, M.
HROL, V. P.
HSIAO, D. K.
HU, R. H.
HUBBARD, H. H.
HUFHAND, W. R.
HUNGER, H. F.
HUNTER, J. S.
HURT, W. D.
HWANG, H.
HWANG, H. S.
HWANG, J. B. G.

I

IKENOUCHI, M.
ILIFF, R. L.
ILL, M.
ILLARIONOV, A. F.
IMIG, L. A.
IMSHENETSKIY, A. A.
INSLEY, J. A.
IRVING, A. J.
ISHII, S.
ISOBE, T.
ISTOMINA, L. G.
ITABASHI, H.
ITOH, T.
IVANOV, V. N.
IVANOVA, I. E.
IVLEV, L. S.
IWAMATSU, T.
IWATA, M.

J

JACOBS, F. A.
JACOBSON, L. A.
JAIN, R. K.
JANSS, J.
JARED, J. R.
JASHING, C. E.
JAVAN, A.
JESSUP, S. D.
JIMENEZ, R. A.
JINDIA, G.
JOENSSON, G.
JOHNS, D. J.
JOHNSON, F. B.
JOHNSON, J. D.
JOHNSTON, A. A.
JOHNSTON, J. D.
JONES, A. H.
JONES, B. G.
JONES, D. J.
JONES, T. V.
JONES, W. L.
JOVASEVIC, M.

K

KAHAN, W.
KALES, A.
KALES, J. D.
KALRA, S. P.
N75-29262 KAMAT, S. J. N75-29810
N75-29599 KAMIMURA, H. N75-29177
N75-29932 KAMINSKY, Y. N75-29154
N75-29099 KAMIYA, N. N75-29026
N75-29044 KANA, D. D. N75-29127
N75-29905 N75-29453
N75-29261 KAPRALOVA, G. A. N75-29231
N75-29271 KAPUSTIN, V. N. N75-29672
N75-29666 KARAYIANIS, N. N75-29873
N75-29166 KAREL, S. N75-29067
N75-29571 KARMAZOV, M. G. N75-29295
N75-29605 KASPAROVA, O. V. N75-29256
N75-29985 KATAN, T. N75-29341
N75-29848 KATTAWAR, G. W. N75-29605
N75-29062 N75-29985
N75-29217 KAUFMAN, H. R. N75-29175
N75-29290 KAWAMURA, R. N75-29408
N75-29944 KAZEL, S. N75-29072
N75-29862 KELLAWAY, W. N75-29053
N75-29025 KELLERMANN, K. I. N75-29967
N75-29182 KELLNER, H. A. N75-29689
N75-29038 KELLY, J. T. N75-29180
N75-29217 KELTNER, D. J. N75-29942
N75-29257 KENNEDY, D. N75-29550
N75-29523 KENNEL, C. F. N75-29612
N75-29102 KEPNER, L. A. N75-29744
N75-29370 KESKULA, J. N75-29461
N75-29381 KIENHUIS, H. N75-29744
N75-29586 KIERNER, G. N75-29251
N75-29264 KIM, H. C. N75-29901
N75-29349 KIM, M. N75-29082
N75-29601 KIM, Y. G. N75-29242
N75-29803 N75-29243
N75-29133 KIMURA, N. N75-29348
N75-29136 KINCHIN, C. G. J. N75-29745
N75-29008 KIRAN, E. N75-29226
N75-29768 KISNER, L. S. N75-29433
N75-29569 KITAMURA, K. N75-29027
N75-29083 KLEIN, L. R. N75-29454
N75-29755 KLEIN, M. B. N75-29416
N75-29077 KLIMENTJEV, P. I. N75-29643
N75-29611 KLUMPP, W. N75-29363
N75-29378 KNEBA, M. N75-29872
KOBAYASHI, A. N75-29477
KOBLINSKY, C. N75-29680
KOCH, D. N75-29964
KOCHER, C. N75-29162
N75-29348 KOGLER, F. C. N75-29705
N75-29159 KOITER, W. T. N75-29478
N75-29151 KOLB, C. E. N75-29886
N75-29971 KOLOVERTNOV, P. D. N75-29258
N75-29092 KOLTAKOV, I. N. N75-29678
N75-29732 KONDRATYEV, K. Y. N75-29533
N75-29938 KOPCHENOV, V. M. N75-29673
N75-29974 KOPEIKA, P. I. N75-29224
N75-29178 KOPELEV, S. Z. N75-29120
N75-29792 KOPROV, B. M. N75-29669
N75-29979 KORB, C. L. N75-29602
N75-29980 KOROTKOV, A. I. N75-29213
N75-29026 KOROTKOV, V. A. N75-29343
N75-29026 KOROTOV, A. I. N75-29658
N75-29645 KORZOV, V. I. N75-29670
N75-29646 N75-29671
N75-29667 KOSHINUMA, T. N75-29122
N75-29669 KOSHMIN, V. P. N75-29568
N75-29721 KOSTKO, O. K. N75-29627
N75-29889 KOVENSKAYA, B. A. N75-29921
N75-29739 KOWALSKI, B. R. N75-29580
N75-29237 KOZLOVITCH, V. I. N75-29643
KRASIKOV, P. N. N75-29697
KRASIUK, V. S. N75-29682
KRAUS, G. C. N75-29613
KRITSUK, A. A. N75-29463
N75-29488 KROGVIG, A. N75-29689
N75-29317 KRUEGERMEYER, L. N75-29668
N75-29581 KRUSPE, G. N75-29668
N75-29479 N75-29669
N75-29588 KRUTZ, R. W., JR. N75-29727
N75-29596 KUDO, K. N75-29178
N75-29234 KUDRYAVTSEV, V. N. N75-29683
N75-29715 KUDZEVICH, Z. S. N75-29565
N75-29191 KUHN, P. M. N75-29674
N75-29062 KULBADH, V. R. N75-29498
N75-29987 KULTASHEV, O. K. N75-29922
N75-29480 KUMMER, W. H. N75-29291
N75-29481 KUNOO, K. N75-29471
N75-29301 KURNOSOV, A. I. N75-29928
N75-29163 KURODA, S. N75-29739
N75-29440 KUZNETSOV, V. N75-29758
N75-29160 KUZNETSOVA, S. M. N75-29246
N75-29259 KVASOV, F. I. N75-29255
N75-29586
N75-29033
N75-29367
N75-29722
N75-29725
N75-29658

L

LACHAMBRE, J. L. N75-29411
N75-29412
LAKTIONOV, A. G. N75-29673
LAL, R. B. N75-29914
LALLY, F. T. N75-29441
LALUMIERE, L. N75-29716
N75-29835 LAM, K. S. N75-29626
N75-29743 LAMAR, D. L. N75-29521
N75-29743 LAMBERT, J. C. N75-29479
N75-29863 LANCASTER, M. C. N75-29728

LANDGREBE, D. A. N75-29736
LANG, P. E. N75-29527
LANG, R. E. N75-29528
LANGER, D. W. N75-29950
LAPAYEV, E. N75-29707
LAPERRIERE, A. J. N75-29190
LARSON, D. N75-29758
LARSON, S. E. N75-29509
LATANISION, R. M. N75-29285
LATIMER, J. N75-29704
LAUGGINGER, L. W. N75-29260
LAVIGNE, P. N75-29535
N75-29844
N75-29411
N75-29412
LAWRENCE, T. L. N75-29351
LAWSON, R. L. N75-29753
LAXPATI, S. R. N75-29312
LAZZARA, C. P. N75-29219
LEBEDEV, B. P. N75-29230
LEBEDEV, I. V. N75-29371
LEE, J. A. N75-29599
LEE, L. P. N75-29365
LEHNERT, B. N75-29897
LEMONE, M. A. N75-29662
LENNERT, A. E. N75-29425
LENT, P. C. N75-29509
LENZEN, K. H. N75-29017
LEON, B. J. N75-29077
LEONOV, M. Y. N75-29499
LEPPARD, W. R. N75-29589
LERDAL, D. A. N75-29227
LEVERETT, S. D., JR. N75-29727
LEVY, E., JR. N75-29567
LEW, H. S. N75-29492
LIGNON, R. N75-29992
LILA, A. N. N75-29643
LINDENLAUB, J. C. N75-29529
LINDER, F. N75-29325
LINDSTROEM, J. L. N75-29913
LINFORD, R. M. F. N75-29135
N75-29407
LIU, D. T. N75-29097
LOGAN, B. G. N75-29902
LOMACKY, O. N75-29261
LONGBOTHUM, R. L. N75-29603
LONGRIDGE, T. M., JR. N75-29771
LOUMOS, G. L. N75-29959
LOUP, J. N75-29167
LOWE, P. R. N75-29703
LUKAS, G. N75-29797
LUMSDAINE, E. N75-29115
LUSHPA, A. I. N75-29222
LYAKH, S. P. N75-29732
LYNCH, L. M. N75-29457
LYNCH, T. E. N75-29730
LYSENKO, S. V. N75-29732

M

MABRY, J. E. N75-29090
MACDONALD, A. G. J. N75-29046
MACRIS, C. J. N75-29982
MAGEE, E. M. N75-29596
MAIANI, L. N75-29912
MAKAROV, N. I. N75-29788
MALKEVICH, M. S. N75-29979
N75-29980
MANDERSCHEID, L. V. N75-29505
N75-29508
N75-29511
N75-29517
N75-29518
N75-29522
MANDICS, P. A. N75-29665
MANGOLD, H. N75-29304
MANN, J. Y. N75-29244
MARCHENKO, A. I. N75-29566
MARCHETTI, M. N75-29990
MARCUS, H. L. N75-29934
MARCY, R. D. N75-29216
MARGOLINA, E. M. N75-29231
MARGULIES, R. S. N75-29612
MARSH, A. H. N75-29093
MARSHALL, R. D. N75-29436
MARSTON, C. H. N75-29420
MARTIANOVA, G. N. N75-29672
MARTIN, D. M. N75-29218
MARTIN, D. W. N75-29664
MARTIN, E. E. N75-29578
N75-29579
MARTIN, P. L. N75-29397
MARTYNOV, D. Y. N75-29970
MARTYNOVSKII, V. S. N75-29935
MASAKI N75-29262
MASLEN, K. R. N75-29782
MASSING, D. E. N75-29783
N75-29784
MASUDA, W. N75-29408
MATEER, G. G. N75-29384
MATHIAS, S. N75-29271
MATHURIN, M. N75-29994
MATOLCSY, M. N75-29448
MATSUDA, Y. N75-29122
MATSUSHITA, H. N75-29027
MATSUSUE, K. N75-29476
MATTHIAE, G. N75-29861
MATTOX, D. M. N75-29183
MAURER, J. N75-29076
MAXIMOV, Y. V. N75-29184
MAZIN, I. P. N75-29654
N75-29663
MCBRIDE, R. T. N75-29938
MCCAFFERTY, E. N75-29556
MCCAFFREY, B. J. N75-29390
MCCALL, J. R. N75-29973
MCCANDLESS, L. C. N75-29592
MCCARTHY, J. F. N75-29338
MCCAULEY, E. J., III N75-29803
MCCLELLEN, F. P. N75-29496
MCCOLLOUGH, J. B. N75-29636
MCFARLAND, A. L. N75-29068
MCGAVIN, R. E. N75-29700
MCGILLEM, C. D. N75-29530
MCGOUGH, J. N75-29129
MCGRATH, R. J. N75-29567
MCMULLAN, W. J. N75-29940
MCMURTRY, G. J. N75-29504
N75-29510
MEEK, C. C. N75-29586
MEETER, E. N75-29744
MEISSNER, H. N75-29907
MELNICHUK, Y. N75-29663
MENCHENKO, I. A. N75-29893
MENDES, G. N75-29535
MENJSHOV, J. A. N75-29648
MENSHENIN, V. D. N75-29658
MENSHOV, J. A. N75-29645
MENSHOV, M. A. N75-29646
MEREDITH, R. E. N75-29608
MEREMBECK, B. F. N75-29504
MERIFIELD, P. M. N75-29521
MESTRE, A. N75-29991
METCALFE, J. E. N75-29554
MEULMAN, A. E. N75-29252
MEYER, G. N75-29853
MIELE, A. N75-29815
MIKHIN, A. A. N75-29292
MILLER, B. A. N75-29353
MILLER, C. G. N75-29277
MILLER, C. W. N75-29867
MILLER, D. E. N75-29689
MILLER, E. F. N75-29284
MILLER, J. B. N75-29894
MILLER, W. F. N75-29514
MILLIER, P. J. F. N75-29146
MILLIS, R. L. N75-29963
MILMAN, D. I. N75-29214
MINH, D. N75-29458
MINNING, F. C. N75-29059
MITCHELL, J. C. N75-29755
MIXSON, J. S. N75-29037
MIYAZAKI, K. N75-29176
MOHAN, H. N75-29960
MOLCHANOV, G. G. N75-29372
MOLL, J. D. N75-29307
MONIN, A. S. N75-29860
MONTGOMERY, O. L. N75-29534
MOORADIAN, A. N75-29423
MOORE, D. N75-29254
MORENCY, J. P. N75-29406
MORGENSTERN, J. P. N75-29508
N75-29511
N75-29517
MORIN, F. J. N75-29933
MORONEY, W. F. N75-29756
MOROSHKIN, K. V. N75-29675
MORRISON, C. A. N75-29873
MORRISON, D. B. N75-29529
MORRISON, T. B. N75-29125
MORSE, P. G. J. N75-29395
MOSES, K. N75-29129
MUEFFELMANN, W. H. N75-29402
MUELLER-GLEWE, J. N75-29669
MUELLER, A. W. N75-29119
MULHOLLAND, J. D. N75-29959
MULLALY, J. R. N75-29248
MULLER, K. N75-29318
MUNDELL, A. R. G. N75-29392
MUNSE, W. H. N75-29254
N75-29500
MUNSELL, C. J. N75-29512
N75-29526
MURAKAMI, Y. N75-29027
MURPHY, J. E. N75-29729
MURPHY, J. H. N75-29337
MURPHY, W. J. N75-29702
MURTHY, S. N. B. N75-29376
MUSLIN, E. N75-29438

N

NAAB, K. N. N75-29784
NABOJKIN, J. V. N75-29405
NAGOYA N75-29262
NAKAMURA, M. N75-29026
NAKAMURA, Y. N75-29176
NAKONECHNY, B. V. N75-29442
NALEPKA, R. F. N75-29398
N75-29511
N75-29517
N75-29518
N75-29522
NATARAJA, R. N75-29480
N75-29481
NAUGHTON, R. J. N75-29400
NAUGLE, D. F. N75-29582
NAUMANN, R. J. N75-29380
NAUSS, R. M. N75-29796
NEEDHAM, J. F. N75-29462
NEINER, G. H. N75-29118
N75-29128
NEKRASOV, I. V. N75-29667
N75-29669
NELSON, S. R. N75-29582
NESVETAILOV, G. A. N75-29343
NETRAVALI, A. N. N75-29827
NEVZOROV, A. I. N75-29654
NEWELL, R. E. N75-29677
NEWIRTH, R. N75-29599
NEZ, G. N75-29516
NICHOLS, C. R. N75-29575
NICHOLSON, P. A. N75-29280
NICODEMUS, L. A. N75-29785
N75-29786
NICOL, W. S. N75-29192
NIEH, S. T. K. N75-29328
NIELSEN, J. N. N75-29071
NIEMAN, A. N75-29089
NISHIMURA, H. N75-29027
NISHIO, K. N75-29122
NISHIO, S. N75-29741
NISKIN, S. N75-29398
N75-29710
N75-29713
N75-29714
N75-29734
NIXON, C. W. N75-29748
NOMIZO, K. N75-29212
NOMURA, M. N75-29026
NOMURA, S. N75-29350
NORDBERG, V. N75-29979
N75-29980
NORDSTROM, K. E. N75-29095
NORREN, R. A. N75-29057
NORTH, R. A. N75-29765
NORTON, H. N. N75-29156
NORWOOD, J. W., JR. N75-29947
NOVODEREZHKIN, V. V. N75-29565
NYLEN, W. E. N75-29121

O

OBRIEN, D. E. N75-29526
OBRIEN, P. J. N75-29076
N75-29319
OCHERETIN, V. N. N75-29344
OGURCOVA, L. S. N75-29405
OHTANI, N. N75-29477
OKUNO, A. F. N75-29384
OKUBOWA, S. N75-29212
OLIVARI, D. N75-29045
OLIVER, V. J. N75-29698
OLJUNIN, U. V. N75-29679
OLTYAN, A. W. N75-29460
ONCLEY, P. B. N75-29090
ONEAL, N. V. N75-29316
ONEILL, P. H. N75-29483
N75-29485
ONO, K. N75-29789
ORANGE, T. W. N75-29473
ORAYEVSKIY, V. N. N75-29895
ORMAND, L. W. N75-29233
OSIPOV, O. I. N75-29332
OSTAPOFF, F. N75-29684
OVERTON, R. K. N75-29805
OVTSCHAROVA, E. N75-29235
OWENS, E. J. N75-29665

P

PADERNO, Y. B. N75-29921
PALENZONA, L. M. N75-29158
PALFREY, J. N75-29268
PALMER, M. D. N75-29149
PANTAZELOS, T. G. N75-29590
PAPENFUSS, C. A. N75-29455
PAPP, J. F. N75-29219
PARKINSON, W. H. N75-29977
PARKS, C. L. N75-29116
PARLETT, B. N. N75-29835
N75-29838
PARR, J. M. N75-29858
PASTRE, C. N75-29689
PASTUSHKOV, R. S. N75-29647
N75-29658
N75-29660
PATTERSON, R. K. N75-29594
PATTON, E. N75-29082

PAVELETS, S. Y. N75-29566
PAYNE, P. R. N75-29752
PEACE, R. L. N75-29617
PEARSON, J. E. N75-29890
PEELE, W. N75-29077
PEELE, W. D. N75-29131
PENA, J. A. N75-29638
PENNYPACKER, S. P. N75-29510
PEPIN, H. N75-29411
PERGAMENT, H. S. N75-29180
PERINI, L. L. N75-29124
PERKINS, C. D. N75-29003
PERKUNOV, A. N75-29720
PERLEE, H. E. N75-29379
PERLMAN, M. N75-29357
PERRY, J. C. N75-29293
PERSSON, C. N75-29685
PERVIER, J. W. N75-29599
PETERSEN, G. W. N75-29504
N75-29510
PETERSON, H. A. N75-29399
PETROSIANTS, M. A. N75-29648
PETROSSIANTS, M. A. N75-29645
N75-29646
PETROWSKI, P. N75-29077
PETRUSHIN, I. V. N75-29295
PETTYJOHN, F. S. N75-29749
PFISTER, G. N75-29363
PHILLIPS, J. D. N75-29552
N75-29570
PHILLIPS, T. J. N75-29693
PIEKAAR, H. W. N75-29549
PIEN, P. C. N75-29377
PIETRZYK, J. P. N75-29961
PINE, A. S. N75-29423
PINKHAM, C. W. N75-29492
PISACANE, V. L. N75-29314
PITTS, D. E. N75-29602
PLASS, G. N. N75-29605
N75-29985
PLATT, W. N75-29129
PLIMMER, R. N. A. N75-29157
PLUNKETT, G. W. N75-29945
PODGORNYJ, A. P. N75-29405
POKROVSKAJA, F. S. N75-29405
POKROVSKIY, O. M. N75-29533
POO, Z. N75-29294
POONAI, P. N75-29513
POPOV, A. I. N75-29372
POPOV, Y. P. N75-29780
POPPA, H. N75-29915
POPPOFF, I. G. N75-29009
PORT, W. G. A. N75-29781
POSTMA, R. W. N75-29382
POTEMKIN, B. A. N75-29776
POTTS, B. M. N75-29311
POULAKOS, C. N75-29637
N75-29981
POULTON, C. E. N75-29524
PRAHARAJ, S. C. N75-29163
PRAMARTADI, B. N75-29951
PRANS, G. P. N75-29907
PRATT, K. G. N75-29036
PRICE, H. C. N75-29745
PRICE, W. L. N75-29305
PRIESMAN, I. N75-29795
PRIETO, L. L. N75-29486
PRINSEN, P. J. A. N75-29323
PRITCHARD, R. H. N75-29221
PROGAR, D. J. N75-29263
PRONI, J. N75-29684
PUDOV, V. P. N75-29667
PUSEY, L. C. N75-29946
PUTHOFF, R. L. N75-29546

R

RADIKEVICH, V. M. N75-29683
RADOSEVIC, R. G. N75-29543
RADZIMINSKI, J. B. N75-29254
RAETH, J. N. N75-29084
RAIKE, W. N75-29802
RAKHUBA, V. K. N75-29343
RALPH, M. N75-29047
RALSTON, R. W. N75-29423
RAO, M. B. N75-29840
N75-29842
RAYMOND, N. V. N75-29457
REASER, J. N75-29795
REBAGLIATI, R. J. N75-29409
RECK, R. H. N75-29955
REDIESS, H. A. N75-29015
REED, H. E. N75-29058
REED, I. S. N75-29306
REESE, L. C. N75-29495
REEVES, E. M. N75-29977
REID, R. J. N75-29259
RENZELMAN, R. F., JR. N75-29925
RESIO, D. N75-29709
REVAY, A. W., JR. N75-29133
N75-29136
REX, A. O. N75-29718
N75-29719
REXER, G. N75-29363
REYNOLDS, G. N75-29129
RHEAULT, F. N75-29411
RICARDI, L. J. N75-29311
RICH, S. R. N75-29590
RICHARDSON, J. M., JR. N75-29847
RICKARD, W. H. N75-29502
RIDER, L. N75-29331
RIESBECK, C. K. N75-29811
RIKS, E. N75-29490
ROBERDS, D. W. N75-29425
ROBERTI, A. N75-29917
ROBERTS, K. V. N75-29823
ROBERTS, L. N75-29010
N75-29023
N75-29846
N75-29514
ROBINETTE, H. R. N75-29652
RODENHUIS, D. R. N75-29856
ROENNBERG, A. N75-29447
ROGERS, E. N. N75-29567
ROGERS, H. H. N75-29502
ROGERS, L. E. N75-29085
ROGGE, R. W. N75-29123
ROHY, D. A. N75-29140
ROMANOV, C. A. N75-29656
ROMANOV, Y. A. N75-29258
ROMENETS, V. A. N75-29967
ROMNEY, J. D. N75-29246
RONAMI, G. N. N75-29056
ROOS, R. N75-29766
ROSCOE, S. N. N75-29383
ROSENGREN, L. G. N75-29048
ROSS, A. J. N75-29211
ROSTEN, H. I., J.E. N75-29667
ROSTKOV, A. V. N75-29607
ROSTOKER, G. N75-29493
ROTEN, A. N75-29281
ROWDEN, R. A. N75-29885
ROWE, E. M. N75-29541
ROZELLE, R. B. N75-29922
ROZHKOV, S. E. N75-29384
RUBESIN, M. W. N75-29223
RUBTSOV, Y. I. N75-29064
RUCKER, R. A. N75-29012
RUDEY, R. A. N75-29247
RUFF, P. E. N75-29814
RUGH, W. J. N75-29445
RUMYANTSEV, G. I. N75-29830
RUNDELL, W. N75-29657
RUPRECHT, E. N75-29787
RYBACK, W. H.

S

SAGARIA, S. D. N75-29763
SAINTCLAIR, T. L. N75-29263
SAKAI, T. N75-29237
SALOMONSSON, O. N75-29856
SAMSONOV, G. V. N75-29921
SANDERS, R. G. N75-29590
SANMARTIN, J. R. N75-29266
N75-29881
SANTORO, G. N75-29240
SARGENT, D. C. N75-29812
SARGISSON, D. F. N75-29093
SARKHEL, A. N75-29249
SARRI, D. P. N75-29057
SASAKI, K. N75-29739
SATA, T. N75-29239
SCANO, A. N75-29726
SCHAIRER, G. S. N75-29019
SCHATT, F. N75-29070
SCHATZKI, T. F. N75-29580
SCHEIDT, D. C. N75-29453
SCHLIVE, J. N75-29488
SCHILIZZI, R. T. N75-29967
SCHLICHTING, J. N75-29245
SCHLIECKERT, G. J. N75-29078
N75-29287
SCHMID, T. E. N75-29248
SCHMIDT, L. E. N75-29583
SCHMITT, R. J. N75-29407
SCHNEIDER, L. W. N75-29747
SCHOENBERG, I. J. N75-29825
SCHOLL, H. F. N75-29037
SCHOONMAKER, P. B. N75-29132
SCHUETZ, W. N75-29385
SCHULTE-HILLEN, J. N75-29936
SCHULTZ, D. L. N75-29367
SCHULZE, B. R. N75-29100
SCHUNK, H. N75-29304
SCHWARTZ, W. A. N75-29599
SCOTT, A. M. N75-29864
N75-29865
SCOWEN, R. S. N75-29794
SEBACHER, D. I. N75-29365
SEIDENSTICKER, R. G. N75-29910
SEIGLE, L. N75-29249
SELANDER, K. N75-29856
SELEZNEVA, I. K. N75-29225
SELLERS, B. N75-29625
SELLERS, R. N75-29684
SEMENCHENKO, B. A. N75-29672
SEMOVA, A. Y. N75-29673
SEN, P. K. N75-29832
SHACKELFORD, R. G. N75-29388
SHAFFER, D. B. N75-29967
SHALIMOV, A. G. N75-29258
SHAMSHIN, V. M. N75-29777
SHANBHAG, D. N. N75-29842
SHANKAR, S. N75-29249
SHANKS, R. E. N75-29119
SHAPIRO, I. I. N75-29962
SHARDANAND N75-29960
SHATALOV, V. N75-29087
SHAW, B. W. B. N75-29034
SHAW, R. N75-29550
SHCHEPIN, E. K. N75-29372
SHEA, M. A. N75-29973
SHELUS, P. J. N75-29959
SHEN, W. C. N75-29616
SHEPHERD, W. T. N75-29112
SHERWIN, J. R. N75-29613
SHETH, S. G. N75-29264
SHEVCHIK, N. J. N75-29190
SHIRA, C. S. N75-29236
SHIRATORI, T. N75-29739
SHNAID, I. M. N75-29935
SHOWERS, R. M. N75-29162
SHRIVER, E. L. N75-29768
SHUGAEV, V. F. N75-29654
SHUPIATSKY, A. B. N75-29658
SHUPJATSKY, A. B. N75-29660
SHUSHKOV, A. A. N75-29667
SHUSKOV, A. A. N75-29669
SIDKO, F. Y. N75-29893
SIDMAN, K. R. N75-29264
SIEDLER, G. N75-29681
SIGFRIDSSON, B. N75-29913
SIGNER, H. N75-29429
SIKORA, J. P. N75-29399
SILJAK, D. D. N75-29852
SILVA, L. F. N75-29519
SILVERBERG, E. C. N75-29959
SIMASHKEVICH, A. V. N75-29927
SIMMONS, A. J. N75-29311
SIMON, C. W. N75-29770
SIMPSON, J. N75-29655
SIMPSON, R. H. N75-29655
SIMPSON, T. R. N75-29064
SIROCKY, P. N75-29546
SISKOV, I. A. N75-29633
SIVAEVA, E. K. N75-29258
SKALSKI, S. C. N75-29497
SKLJAROV, L. J. N75-29817
SKOROBOGATOV, G. A. N75-29220
SKURIDIN, G. A. N75-29144
SLEMP, W. S. N75-29431
SLEPTSOV-SHEVLEVICH, B. A. N75-29676
SLIMAK, K. N75-29592
SLOBODNIK, A. J., JR. N75-29870
SLUTSKY, S. N75-29113
SMART, D. F. N75-29973
SMIRNOV, B. G. N75-29923
SMIRNOV, O. A. N75-29439
SMIRNOVA, N. B. N75-29923
SMITH, C. L. N75-29640
SMITH, E. W. N75-29702
SMITH, G. N. N75-29619
SMITH, M. G. N75-29769
SMITH, M. R. N75-29367
SMITH, R. J. N75-29483
SMITH, S. J. N75-29100
SMITH, T. B. N75-29617
SMITH, W. L. N75-29616
SMITE, W. R. N75-29335
SMYTHE, R. E. N75-29940
SNIEDER, J. N75-29321
SNITKOVSKY, A. I. N75-29650
SNYDER, R. G. N75-29747
SODERHOLM, P. R. N75-29537
N75-29538
N75-29539
SOKOLENKO, V. F. N75-29229
SOKOLOVSKAYA, Y. M. N75-29246
SOUTH, J. C., JR. N75-29033
SPALDING, D. B. N75-29211
SPARKS, R. H. N75-29432
SPAULDING, M. N75-29712
SPEAKE, D. W. N75-29730
SPENCER, W. T. N75-29916
SRINIVASAN, R. N75-29254
STACEY, G. S. N75-29581
STAELIN, D. H. N75-29626
STALL, D. N75-29304
STALMACH, C. J., JR. N75-29356
STANGE, W. C. N75-29430
STARR, T. B. N75-29692
STATON, L. D. N75-29965
STEINER, T. O. N75-29755
STEINFINK, H. N75-29918
STENT, M. W. N75-29390
STENZEL, R. N75-29901
STENZEL, R. L. N75-29900
STEPHENS, J. B. N75-29277
STEPHENSON, H. W. N75-29948
STEPHENSON, M. R. N75-29748
STETTNER, R. N75-29866
STEWART, R. W. N75-29414
STIDD, C. K. N75-29708
STOCKMAN, N. O. N75-29110

STOKES, C. S. N75-29702
STOLOVICH, N. N. N75-29343
STONE, B. T. N75-29100
STONE, M. V. N75-29288
STONE, R. W., JR. N75-29774
STOWE, D. E. N75-29746
STRAETER, B. N75-29035
STRAHLE, W. C. N75-29268
STREET, J. S. N75-29512
N75-29526
STREET, P. G. N75-29049
STROKIN, V. N. N75-29228
STROLE, J. N75-29129
STROSCIO, M. A. N75-29625
STSIBORSKIY, O. B. N75-29673
STURM, G. P., JR. N75-29598
STURROCK, P. A. N75-29969
STUTZ, J. N75-29802
SUBBARAO, R. B. N75-29886
SUDDATH, L. P. N75-29494
SUGAWARA, K. N75-29739
SUGIYAMA, N. N75-29122
SUIT, W. T. N75-29039
SULEJKIN, V. V. N75-29634
SULIMOV, A. A. N75-29213
SUN, D. N75-29622
SUNDHEIM, B. R. N75-29924
SUSARLA, V. N75-29828
SUTTERFIELD, F. D. N75-29598
SUTTON, G. L. N75-29401
SUYEMOTO, T. N75-29804
SVETLOVA, T. P. N75-29651
SVIDKOVSKIJ, E. G. N75-29627
SWAIN, H. A., JR. N75-29541
SWAIN, P. H. N75-29528
N75-29536
SWEET, W. A. N75-29703
SYTAYA, E. P. N75-29923
SYUNYAYEV, R. A. N75-29971
SZALAI, K. J. N75-29015
SZPAK, S. S. N75-29341
SZUCH, J. R. N75-29108
SZWARC, J. R. N75-29417

T

TABAKOFF, W. N75-29109
TADAKI, T. N75-29349
TAG, I. N75-29115
TAHERI, S. H. N75-29162
TAKEUCHI, K. N75-29789
TALHELM, D. L. N75-29308
TAMURA, A. N75-29354
N75-29355
TAMURA, H. N75-29212
TANG, J. T. N75-29904
TANKUS, A. Y. N75-29393
TANNEHILL, J. C. N75-29038
TARANENKO, V. P. N75-29292
TATCHELL, D. G. N75-29211
TATE, E. N75-29420
TAYLOR, R. C. N75-29290
TAYLOR, R. L. N75-29413
TEJEDA, J. N75-29190
TENNFORS, E. N75-29898
TER-MARKARYANTS, N. E. N75-29670
N75-29571
TERSKOV, I. N75-29606
TEUSCHLER, J. M. N75-29403
THAYER, D. L. N75-29152
THEOBOLD, D. M. N75-29944
THIEBAUD, P. M. N75-29316
THOMAS, C. R. N75-29491
THOMAS, H. H. B. M. N75-29094
THOME, R. J. N75-29340
THOMPSON, A. B. N75-29724
THOMPSON, A. J. N75-29736
THOMPSON, B. G. J. N75-29043
N75-29046
N75-29047
THOMPSON, D. T. N75-29963
THOMPSON, G. S., JR. N75-29576
THOMPSON, J. C. N75-29931
THOMPSON, M. R. N75-29494
THRASHER, C. N75-29254
THREATT, D. H. N75-29746
TIETZE, J. L. N75-29815
TIHOMIROV, V. V. N75-29428
TIKHONOV, N. D. N75-29120
TIMOSHUK, A. S. N75-29444
TISCENKO, V. G. N75-29405
TODD, J. S. N75-29555
TOLSTIKOV, Y. N75-29772
TOMKING, J. N75-29586
TONEY, C. R. N75-29785
N75-29786
TONI, J. E. N75-29409
TORGERSON, D. R. N75-29334
TORREY, C. T. N75-29248
TOSH, J. D. N75-29440
TOSSMAN, B. E. N75-29152
TOTH, I. J. N75-29441
TOWNSEND, D. P. N75-29435
TPITAKIS, B. N75-29637
TRAPEZNIKOV, U. A. N75-29679
TRAUBENBERG, I. A. N75-29295
TRICOT N75-29437
TROMP, P. J. N75-29488
TROYON, F. N75-29823
TRUIJENS, C. L. N75-29760
TSCHANZ, J. F. N75-29572
TSCHERNING, C. C. N75-29615
N75-29618
TSE, B. K. N75-29330
TSIOLKOVSKIY, K. E. N75-29141
TUER, T. W. N75-29608
TULINIUS, J. N75-29089
TURK, J. S. N75-29969
TURNBULL, L. S. N75-29622
TYABIN, N. I. N75-29676
TYULPANOV, R. S. N75-29229
TYZHNOV, Y. V. N75-29421

U

UDOVENKO, V. F. N75-29732
URANO, T. N75-29239
URBAN, L. V. N75-29581
USYNIN, Y. S. N75-29332

V

VAKULENKO, V. M. N75-29333
VANDERBIJL, B. N75-29869
VANDERMAST, C. A. P. G. N75-29760
VANDERNEUT, A. N75-29489
VANDERVET, W. J. N75-29252
N75-29452
VANDERZANDEN, J. N75-29366
VANHOLTEN, T. N75-29055
VANIN, A. G. N75-29393
VANMEETEREN, A. A. N75-29688
VANORNUM, D. G. N75-29318
VANRYZIN, J. N75-29828
VANSCHAIK, H. J. N75-29322
VANTIGGELEN, A. N75-29215
VANWOERKOM, P. C. M. N75-29917
VARY, A. N75-29241
VDOVINA, T. C. N75-29439
VEIT, K. H. N75-29705
VERBEEK, W. N75-29267
VIECELI, J. J. N75-29418
VINCENT, L. N75-29709
VINE, J. N75-29961
VINK, J. A. J. N75-29744
VISSER, R. P. L. S. N75-29744
VIVIAND, H. N75-29993
VLADIMIROV, O. A. N75-29678
VLIEGER, H. N75-29487
VOLKOV, J. A. N75-29669
VORONKOV, E. N. N75-29928

W

WAGENAAR, W. A. N75-29762
N75-29763
WAGNER, H. G. N75-29872
WAGNER, R. N75-29470
WALKDEN, F. N75-29042
WALKER, C. L. N75-29433
WALKER, D. M. C. N75-29148
WALKER, M. S. N75-29337
WALKER, R. E. N75-29415
WALOWIT, J. N75-29443
WALSH, J. R., JR. N75-29388
WALTER, C. H. N75-29326
WANDERER, D. N75-29062
WANHILL, R. J. H. N75-29252
N75-29253
WARD, J. M. N75-29373
WARDEN, M. P. N75-29300
WASHBURN, K. E. N75-29091
WATERFALL, A. P. N75-29048
WEAVER, W. L. N75-29156
WEBER, J. N75-29052
WEICKMANN, H. K. N75-29653
N75-29674
WEIR, A. D. N75-29793
WEISS, R. B. N75-29798
WELBAUM, R. G. N75-29939
WELCH, R. I. N75-29524
WENGLINSKI, T. H. N75-29132
WERNER, C. F. N75-29742
WERZ, A. W. N75-29030
WESSON, T. C. N75-29598
WESTCOTT, R. A. N75-29081
WETZEL, R. N75-29592
WHEELER, M. F. N75-29826
WHISLER, F. D. N75-29514
WHITE, A. H. N75-29125
WHITE, R. S. N75-29984
WHITE, T. D. N75-29134
WHITE, W. H. N75-29617
WHITEHEAD, D. S. N75-29640
WHITTLE, P. B. N75-29745
WILEY, R. W. N75-29749
WILKINSON, D. R. N75-29131
WILLIAMS, C. N75-29077
WILLIAMS, G. O. N75-29707
WILLIAMS, R. G. N75-29806
N75-29807
N75-29808
WILLIAMSON, G. N75-29102
WILLIGES, B. H. N75-29764
WILLIGES, R. C. N75-29307
N75-29764
WILLIS, P. N75-29663
WILSON, N. G. N75-29095
WILSON, W. E. N75-29594
WILSON, W. E., JR. N75-29124
WIMP, J. N75-29834
WINSOR, N. K. N75-29422
WIRTANEN, T. E. N75-29139
WIRZ, H. J. N75-29044
WITTMANN, A. N75-29567
WOESSNER, G. N75-29171
WOLFRAM, T. N75-29933
WOLFRUM, J. N75-29872
WONG, A. Y. N75-29901
WOOD, L. E. N75-29317
WOODS, D. R. N75-29608
WOOLAVER, D. A. N75-29711
WOOLCOTT, D. F. N75-29391
WOOLEY, J. A. N75-29495
WOOLF, H. M. N75-29616
WORTMAN, D. E. N75-29873
WU, C. N75-29528
WUCKNITZ, J. N75-29668
N75-29669
WULFF, E. J. N75-29723
WULFINGHOFF, D. N75-29550
WYLIE, D. N75-29659

X

XANTHAKIS, J. N75-29637

Y

YAMADA, A. N75-29178
YAMANAKA, T. N75-29177
YAMANE, K. N75-29789
YAMPOLSKII, Y. P. N75-29184
YANCHENKO, E. L. N75-29889
YANKINA, T. I. N75-29775
YANOWITZ, F. N75-29736
YATES, P. E. N75-29784
YEAGER, E. N75-29257
YEROSHIN, N. S. N75-29893
YEVDOKIMOVA, A. D. N75-29246
YONAIYAMA, M. N75-29476
YOSHIMURA, S. N75-29177

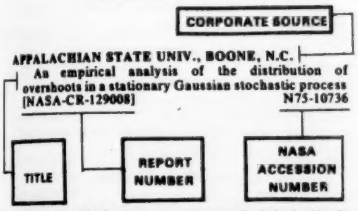
Z

ZABORA, R. F. N75-29238
ZAGRANSKI, R. D. N75-29125
ZAITSEV, L. V. N75-29439
ZAKHAROVA, V. A. N75-29893
ZAFLATYNSKY, I. N75-29187
ZAPOTOWSKI, B. N75-29957
ZARETSKY, E. V. N75-29429
N75-29435
ZAUDERER, B. N75-29420
ZDORIK, Y. M. N75-29635
ZELINSKI, R. N75-29302
ZENK, W. N75-29681
ZHELEZNOV, B. N. N75-29140
ZHURBA, E. V. N75-29656
ZIKOV, I. D. N75-29678
ZIPSER, E. J. N75-29661
ZITTA, V. L. N75-29514
ZLOBEC, S. N75-29800
ZOUCK, J. H. N75-29791
ZUBALY, R. N75-29270
ZUNINO, H. V. N75-29718
N75-29719
ZWAAN, R. J. N75-29056

CORPORATE SOURCE INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 13 NUMBER 20

TYPICAL CORPORATE SOURCE INDEX LISTING


CORPORATE SOURCE
APPALACHIAN STATE UNIV., BOONE, N.C.
An empirical analysis of the distribution of overshoots in a stationary Gaussian stochastic process
[NASA-CR-129008] N75-10736
TITLE
REPORT NUMBER
NASA ACCESSION NUMBER

Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACADEMY OF ATHENS [GREECE].
Solar activity and precipitation within the zones of latitude 0 deg - 40 deg N
N75-29637
On a comparison between the predicted and the observed values of the different indices of solar activity for the 20th solar cycle
N75-29981
Photometric research for the K2, 3 chromospheric flocculi
N75-29982

ACADEMY OF SCIENCES [USSR], KALININGRAD.
An analysis of the surface layer meteorological parameters measurements on equator
N75-29643
Diurnal and semidiurnal variations by meteorological measurements on equator
N75-29644
On the structure of the cumulus clouds at the equator in connection with meteorological conditions according to the stereophotographic measurements on board the R/V Akademik Kurchatov
N75-29656

ACADEMY OF SCIENCES [USSR], MOSCOW.
Aerosol and water vapour influences on direct solar radiation fluxes in the centre of equatorial Atlantic
N75-29672
The experiment of investigation of the dynamics of the upper ocean layer at the Equator
N75-29683

ADVANCED TECHNOLOGY LABS., INC., WESTBURY, N.Y.
An improved numerical procedure for the parametric optimization of three dimensional scramjet nozzles
[NASA-CR-132695] N75-29359
Manual for improved source flow characteristics program
[NASA-CR-132696] N75-29360
An improved source flow characteristic technique for the analysis of scramjet exhaust flow fields
[NASA-CR-132697] N75-29361

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, PARIS [FRANCE].
Technical evaluation report on fluid dynamics panel symposium on Airframe/Propulsion
[AGARD-AR-81] N75-29114
Current status in aerospace medicine
[AGARD-CP-154] N75-29722
Treadmill exercise testing at the USAF School of Aerospace Medicine: Physiological responses in aircrewmen and the detection of latent coronary artery disease
[AGARD-AG-210] N75-29736
Physiological parameters of exercise performance
N75-29737
Electrocardiographic aspects of exercise testing
N75-29738

AEG-TELEFUNKEN, ULM [WEST GERMANY].
Speech signal processing
[BMFT-FB-T-74-44] N75-29304

AEL SERVICE CORP., FARMINGDALE, N.J.
Electromagnetic interference measurements in electronic voice switching equipment areas
[AD-A008925] N75-29288

AEROCHEM RESEARCH LABS., INC., PRINCETON, N.J.
A fully coupled underexpanded afterburning rocket plume program [the AIPP code]. Part 1: Analytical and numerical techniques
[AD-A006235] N75-29180

AERODYNE RESEARCH, INC., BURLINGTON, MASS.
Experimental studies of the collisional excitation of infrared active vibrational stretch modes in CO2 and H2O with an intersecting, hyperthermal molecular beam apparatus, volume I
[AD-A006237] N75-29886

AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON, INC., N.J.
A direct time history study of the response of an airplane to nonstationary turbulence
[AD-A006159] N75-29102

AERONAUTICAL RESEARCH LABS., MELBOURNE [AUSTRALIA].
Higher order wind tunnel corrections for a two-dimensional circular arc lifting aerofoil in a closed rectangular wind tunnel
[ARL/A-NOTE-349] N75-29034
Aircraft engine speed and fuel flow signal conditioner with digital output
[ARL/ME-NOTE-354] N75-29111
The effects of notches of high Kt on the fatigue behaviour of 7178-T6 aluminium alloy
[ARL/SM-354] N75-29244

AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AFB, OHIO.
F-89 hydraulic actuator combinatorial geometric representation
[AD-A006435] N75-29101

AEROPHYSICS RESEARCH CORP., BELLEVUE, WASH.
Theoretical effect of modifications to the upper surface of two NACA airfoils using smooth polynomial additional thickness distributions which emphasize leading edge profile and which vary linearly at the trailing edge
[NASA-CR-137717] N75-29030

AEROSPACE GUIDANCE AND METROLOGY CENTER, NEWARK AIR FORCE STATION, OHIO.
Some indicators for inertial navigation systems reliability
[AD-A006439] N75-29085

AEROSPACE MEDICAL RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.
The effect of quiet on hearing
[AD-A006395] N75-29748

AEROSPACE RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.
Valence band density of states of amorphous and trigonal selenium determined by X-ray and UV photoemission
[AD-A006168] N75-29190

AGENCY FOR AIR NAVIGATION SAFETY IN AFRICA, DAKAR [SENEGAL].
Study of the A- and B-scale disturbances propagating across the African continent
N75-29641

AGNEW TECH-TRAN, WOODLAND HILLS, CALIF.
Study of zirconium-niobium-nickel system by local X-ray analysis
[NASA-TT-F-16474] N75-29246
Study of methods to suppress self-excitation in O-type Traveling Wave Tubes [TWT]
[NASA-TT-F-16479] N75-29292
The measurement of the thermal slip of gases
[NASA-TT-F-16476] N75-29352
Two men in space
[NASA-TT-F-16493] N75-29757
Voices in orbit
[NASA-TT-F-16499] N75-29758

AIR FORCE CAMBRIDGE RESEARCH LABS., L. G. HANSCOM FIELD, MASS.
AFCRL contributions to the National Geodetic Satellite Program [NGSP]
[AD-A006110] N75-29159
Short-term spot size and beam wander in a turbulent medium
[AD-A006032] N75-29413
Geophysics and Space data Bulletin. Volume 11, no. 3, third quarter 1974
[AD-A006402] N75-29501
Atmospheric response function for the calculation of riometer absorption
[AD-A006112] N75-29625
Microwave acoustics handbook. Volume 2: Surface wave velocities, numerical data
[AD-A006113] N75-29870
Irradiance scintillations: Comparison of theory with experiment
[AD-A006365] N75-29888
Radiation induced electron emission
[AD-A006396] N75-29930
Tables of non-vertical cutoff rigidities for 76 various locations
[AD-A006397] N75-29973

AIR FORCE CIVIL ENGINEERING CENTER, TYNDALL AFB, FLA.
A computer program for rigid pavement evaluation
[AD-A006140] N75-29496

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
The characteristics of self sustained particulate boron combustion in air at ambient pressure
[AD-A006039] N75-29233
The impact of metrication on the Defense standardization program
[AD-A006038] N75-29280
A GASP 4 simulation of tactical air interdiction using a choice of weapons loads and continuously changing weather conditions
[AD-A006349] N75-29417
Cost estimating relationships for predicting life cycle costs of inertial measurement unit maintenance
[AD-A006344] N75-29457
An evaluation of heuristic scheduling rules by using a zero-one linear programming approach
[AD-A006348] N75-29458
Evaluation of proposed criteria to be used in the selection of candidated for reliability improvement warranties
[AD-A006335] N75-29460
Computer assisted instructions in system reliability for logistics managers
[AD-A006340] N75-29461
A computer program for evaluation of solid waste resource recovery
[AD-A006356] N75-29583
A simulation of the Emergency Clinic and Department of Primary Care at the Wright-Patterson .FB Medical Center
[AD-A006345] N75-29750
A study to determine the adequacy of the tools and equipment used by Air Force women in the craft skills
[AD-A006342] N75-29767
A computer simulation of release parameter effects upon bomb impact distributions
[AD-A006347] N75-29844
An analysis of the effectiveness of ASPR in proving guidance for the utilization of government-owned industrial plant equipment
[AD-A006351] N75-29938
An investigation of a proposed auction technique as a method of procurement
[AD-A006350] N75-29939
An evaluation of the major qualifications desired of Air Force system program managers
[AD-A006360] N75-29940
Economic analysis and new starts of federal government commercial or industrial activities
[AD-A006359] N75-29950

AIR FORCE MATERIALS LAB., WRIGHT-PATTERSON AFB, OHIO.
Computer analysis of the mass spectra of gas mixtures
[AD-A006160] N75-29221
The development of an automatic multisample isothermal aging apparatus
[AD-A006156] N75-29232

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Application of deuterized compounds for the study of kinetics and mechanism of the thermal conversions of hydrocarbons
[AD-A006007] N75-29184
Combustion of rich kerosene-air mixtures in tunnel type chamber
[AD-A005995] N75-29222
Kinetics and mechanism of the thermal decomposition of salts of hydrazonium
[AD-A005994] N75-29223
On construction of the closed theory of spinning detonation
[AD-A005993/1] N75-29224
Spherically symmetric optical discharge as analog of diffusion combustion in the mixture of fuel gases
[AD-A005991] N75-29225
The process of ignition and combustion of hydrogen in a supersonic flow
[AD-A006012] N75-29228
Analysis of the structure of the diffusion flames of hydrogen
[AD-A006008] N75-29229
Stabilization of the flame of heterogeneous mixtures
[AD-A006010] N75-29230
Rate constants of some elementary stages of the reaction of fluorine with hydrogen
[AD-A006011] N75-29231
Heat treatment of the VT22 alloy
[AD-A006005] N75-29256
Analysis of fires caused by short circuits in cable networks in mines in the Ukrainian SSR
[AD-A006002] N75-29336
On the question of static computation of saddle-shapped suspended coverings according to a discrete diagram
[AD-A005997] N75-29498

AIR FORCE WEAPONS LAB., KIRTLAND AFB, N.MEX.
USAF aircraft pollution emission factors and landing and takeoff LTO cycles
[AD-A006239] N75-29582

AIR PRODUCTS AND CHEMICALS, INC., MARCUS HOOK, PA.
Engineering and cost study of air pollution control for the petrochemical industry. Volume 2: Acrylonitrile manufacture
[PB-240986/0] N75-29599

ALASKA UNIV., FAIRBANKS.
Use of LANDSAT imagery for wildlife habitat mapping in northeast and east central Alaska
[E75-10367] N75-29509
Land use maps of the Tanana and Purcell Mountain areas, Alaska, based on Earth Resources Technology Satellite imagery
[E75-10383] N75-29525

AMERICAN ELECTRONIC LABS., INC., LANSDALE, PA.
Low-level modulator and isolator-limiter-detector development
[AD-A006296] N75-29308

AMERICAN SCIENCE AND ENGINEERING, INC., CAMBRIDGE, MASS.
Small astronomy satellite-A, Uhuru data analysis
[NASA-CR-144660] N75-29964

AMS, INC., CLAREMONT, CALIF.
Developments in computer aided software maintenance
[AD-A005827] N75-29805

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., SILVER SPRING, MD.
Full-scale aerodynamic and engine testing of the APL Symdel Mk 6 RPV
[AD-A006283] N75-29099
Ramjet technology. Chapter 6: Ramjet fuels
[AD-A006114] N75-29124
Interactions between SAS-C spacecraft nutations and spin-rate control system
[AD-A006115] N75-29152
Digital Doppler processing using Walsh and quantized Fourier transforms
[AD-A006116] N75-29313
Ionospheric effects on transionospheric measurements of range and range difference
[AD-A006118] N75-29314
Parametric investigation of the Na-N2O + CO chemical laser
[AD-A006117] N75-29415
Use of a microprocessor in a supervisory control application
[AD-A006119] N75-29791

ARGONNE NATIONAL LAB., ILL.
Airport vicinity air pollution study: The impact of modified aircraft taxi procedures on airport air quality
[AD-A009882] N75-29572
Environmental regulations and energy for home heating
[PB-240699/9] N75-29587

ARIZONA UNIV., TUCSON.
Large diameter active mirror with holographic figure sensing
[AD-A006211] N75-29892

ARMY AEROMEDICAL RESEARCH LAB., FORT RUCKER, ALA.
Evaluation of proposed electroplated HGU-4-/P frames
[AD-A006121] N75-29749

ARMY AIR MOBILITY RESEARCH AND DEVELOPMENT LAB., CLEVELAND, OHIO.
Fretting of titanium at temperatures to 650 C in air
[NASA-TN-D-8048] N75-29250
Analysis of dynamic capacity of low-contact-ratio spur gears using Lundberg-Palmgren theory
[NASA-TN-D-8029] N75-29434

ARMY AVIATION SYSTEMS COMMAND, ST. LOUIS, MO.
Major Item Special Study [MISS], UH-1H 90 degrees T/R gear box
[AD-A006506] N75-29098
Optimization of the time between aircraft overhauls by minimizing maintenance cost
[AD-A006505] N75-29100

ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N.H.
Model studies of drifting snow patterns at safeguard facilities in North Dakota
[AD-A006018] N75-29701

ARMY CONSTRUCTION ENGINEERING RESEARCH LAB., CHAMPAIGN, ILL.
Load deflection behavior of lime stabilized layers
[AD-A006015] N75-29494
Handbook for environmental impact analysis
[AD-A006241] N75-29581

ARMY ELECTRONICS COMMAND, FORT MONMOUTH, N.J.
Preliminary safety analysis of lithium batteries
[AD-A006149] N75-29569

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Porous friction surface course
[AD-A009012] N75-29134
Comparative performance of structural layers in pavement systems. Volume 3: Design and construction of MESL
[AD-A005893] N75-29472
Effect of yaw angle on steering forces for the lunar roving vehicle wheel
[NASA-CR-143290] N75-29976

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER, CHARLOTTESVILLE, VA.
Calculation of changes in the period of a satellite based on synchronous visual observations
[AD-A006095] N75-29151
Formal kinetics of reactions occurring in photodissociation gas lasers
[AD-A005954] N75-29220
Aluminum alloys: Industrial deformable, sintered and light aluminum alloys
[AD-A005984] N75-29255
Effective ways of utilizing synthetic slags in steel making
[AD-A005982] N75-29258
Features of using reversing thyristor excitors with separate control in electric drive systems
[AD-A006088] N75-29332
Thyristor control of an inductive capacitive converter for charging capacitive energy tanks
[AD-A006080] N75-29333
A thyristor dc switch
[AD-A005957] N75-29342
An investigation of the influence of the wet surface area of a positive electrode on the energy conversion efficiency during the electrical explosion of conductors
[AD-A005971] N75-29343
Characteristics of energy released in a channel formed by an exploding wire
[AD-A005959] N75-29344
Analysis of flow in a bistable fluidic element to improve its characteristics
[AD-A006087] N75-29371
Fluidic hydraulic element with high input resistance
[AD-A006078] N75-29372
Application of the helicopter KA-26 to large-scale aerial photography
[AD-A005950] N75-29393
Mass-production model of automatic RDV-1 photometer for measuring and recording atmospheric transparency
[AD-A006076] N75-29394
Optical-band antennas
[AD-A005966] N75-29421
New machinery and materials
[AD-A005953] N75-29438
West German self-propelled cranes with hydraulic booms
[AD-A005948] N75-29439
Design of hydraulic rollers for treating ceramic materials with consideration
[AD-A006099] N75-29444
The application of the phenomenon of selective transfer to increase the durability of parts in fuel units
[AD-A005975] N75-29445
Dynamic method of investigating the stability of a compressed rod
[AD-A005965] N75-29499
State standards of the USSR, lead-acid automotive storage batteries GOST 959.0-71
[AD-A006093] N75-29563
Thermoelectric properties of natural lead sulfide and synthetic N-lead sulfide
[AD-A006082] N75-29564
Effect of the electrolyte temperature during charging of plates on the characteristics of electrodes and cells of lead acid automotive storage batteries
[AD-A006079] N75-29565
Long wave sensitivity of solar converters N-CdS-Cu[2-x]S
[AD-A005918] N75-29566
An automatic charge-discharge device for testing storage batteries
[AD-A005978] N75-29568
Microphysical characteristics of local fogs
[AD-A006075] N75-29697
Comparative characteristics of the main types of climatic clothing of Vostok Station personnel
[AD-A005876] N75-29788
Solution of problems in physical and chemical kinetics by the Monte Carlo method
[AD-A006083] N75-29874
Radiation scattering by atmospheric aerosols
[AD-A006081] N75-29889
Light absorption in suspensions of large soft particles of arbitrary shape
[AD-A005970] N75-29899
Electrical and thermoemission properties of alloys lanthanum and cerium hexaborides with transition metals
[AD-A005980] N75-29921
Work function and adsorption properties of yttrium group rare earth metals
[AD-A005979] N75-29922
Work function of the [100] faces of single crystals of refractory metal alloys
[AD-A005967] N75-29923
Research on semiconductor physics in the Electrophysical Department, 25th anniversary of the founding of V. I. Lenin Kishinev State University
[AD-A006092] N75-29927
Semiconductor microelectronics
[AD-A006074] N75-29928
Admixtures in germanium, silicon and gallium arsenide recombination characteristics
[AD-A006097] N75-29929

ARMY MATERIEL COMMAND, TEXARKANA, TEX.
A development and analysis of multiple range techniques for controlling the variability of a process characteristic with a uniform distribution
[AD-A006478] N75-29456

ARMY TANK-AUTOMOTIVE COMMAND, WARREN, MICH.
The Rayleigh velocity for a slightly anisotropic, orthotropic solid
[AD-A006148] N75-29920

ARMY TROOP SUPPORT COMMAND, ST. LOUIS, MO.
Designing a manual cost data base
[AD-A006508] N75-29948

ARMY WAR COLL., CARLISLE BARRACKS, PA.
Oil and US policy
[AD-A006473] N75-29558

ARO, INC., ARNOLD AIR FORCE STATION, TENN.
Interferometric instrumentation for particle size analysis
[AD-A006136] N75-29425

ARTICHESKII I ANTARKTICHESKII NAUCHNO-ISSLEDOVATELSKII INSTITUT, LENINGRAD [USSR].
On the reality of existence of sporadic large-scale eddy formations in the ocean
N75-29676
Main statistical characteristics of currents in the northern part of B-scale
N75-29678
On representativity of wave measurements made by Soviet ships during Tropical Experiment-74
N75-29679

ATHENS UNIV. [GREECE].
Simultaneous observation of TEC from North and South Hemisphere during the 30th June 1973 solar eclipse
[AD-A006201] N75-29983

ATLANTIC RESEARCH CORP., ALEXANDRIA, VA.
Refinement and validation of two digital Microwave Landing System [MLS] theoretical models
[NASA-CR-132713] N75-29066

AUBURN UNIV., ALA.
The effect of sonic boom on the nesting and brood rearing behavior of the eastern wild turkey
[AD-A005986] N75-29730

AVCO CORP., WILMINGTON, MASS.
Photoelectron emission analysis of surface elements of the International Sun Earth Explorer
[NASA-CR-143811] N75-29916

B

BATTELLE COLUMBUS LABS., OHIO.
Determination of structural engineering properties of incoloy 903 and CTX-1 alloys
[NASA-CR-120673] N75-29247
BATTELLE-NORTHWEST, RICHLAND, WASH.
Ecological characteristics of the Boardman Site and environs, Morrow County, Oregon
[PB-241071/0] N75-29502
BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Investigate material systems for a mirrors used in high power CO and CO2 lasers
[AD-A006101] N75-29414
BEHAVIORAL TECHNOLOGY CONSULTANTS, SILVER SPRING, MD.
Stepwise Iterative Fourier Transform: The SIFT
[NASA-CR-144377] N75-29820
BELL AEROSPACE CO., BUFFALO, N.Y.
OPTIM 2: A magic compatible large scale automated, minumum weight design program. Volume 2: Programmers manual
[AD-A006412] N75-29497
BENDIX CORP., COCOA BEACH, FLA.
Protective clothing: Assessment of need, volume 1
[PB-241167/6] N75-29785
Protective clothing: Assessment of need, Volume 2
[PB-241168/4] N75-29786
BENDIX CORP., TETERBORO, N.J.
Digital flight control system redundancy study
[AD-A006411] N75-29129
BETHUNE-COOKMAN COLL., DAYTONA BEACH, FLA.
Remote sensing over North Merritt Island
[E75-10371] N75-29513
BLOCK ENGINEERING, INC., CAMBRIDGE, MASS.
Firebird interferometer
[AD-A005815] N75-29395
BOEING AEROSPACE CO., SEATTLE, WASH.
Thrust chamber life prediction. Volume 1: Mechanical and physical properties of high performance rocket nozzle materials
[NASA-CR-134806] N75-29238
Fracture control method for composite tanks with load sharing liners
[NASA-CR-134758] N75-29449
BOEING CO., SEATTLE, WASH.
University/government/industry relations in aeronautics
N75-29019
What kind of students should be developed through aeronautical engineering education?
N75-29025
BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Wind tunnel test of model target thrust reversers for the Pratt and Whitney aircraft JT8D-100 series engines installed on a 727-200 airplane
[NASA-CR-134709] N75-29117
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
Optimizing the efficiency of computer-aided instruction
[AD-A006424] N75-29797
BONN UNIV. [WEST GERMANY].
Investigation of the structure of precipitation areas
N75-29657
BOOZ-ALLEN AND HAMILTON, INC., BETHESDA, MD.
Alternative strategies for optimizing energy supply, distribution, and consumption systems on Naval bases. Volume 3: Assessment of total energy system applications at Naval facilities
[AD-A003590] N75-29550
BRITISH AIRCRAFT CORP. [OPERATING] LTD., BRISTOL [ENGLAND].
A lifting surface theory method for treating swept or slender wings in attached subsonic flow
[ARC-R/M-3760] N75-29053
Satellite operations model extension
[ESS/SS-617] N75-29146
BRITISH BROADCASTING CORP., KINGSWOOD [ENGLAND].
The estimation of the service areas of medium and long-wave broadcasting stations
[BBC-RD-1975/1] N75-29281
Digital video: Differential coding of PAL colour signals using same-line and two-dimensional prediction
[BBC-RD-1975/20] N75-29282
BRITISH COLUMBIA UNIV., VANCOUVER.
Analysis of large power systems
N75-29850
BRITISH LIBRARY LENDING DIV., BOSTON SPA [ENGLAND].
Spaceship Soyuz-17 in orbit. TASS Announcement
[BLL-M-23714-[5828.4F]] N75-29139
The chemical deposition of dispersion coatings with Ni-P and Ni-B matrices. Embedding of oxides: Titanium dioxide
[BLL-LTI-746-01460-[9022.401]]
N75-29235
A radio telephone system with code division multiplexing
[BLL-PO-3206-[9022.81]] N75-29283
Flow mechanisms and noise in control valves with model tests in the near sonic and supersonic range
[BLL-CE-TRANS-6607-[9022.09]]
N75-29347
Application of the finite element method to fluid problems
[BLL-RTS-9414] N75-29348
Drop formation from single nozzles at high nozzle velocities in liquid-liquid systems
[BLL-RTS-9364] N75-29349
Light conversion in dye lasers
[BLL-M-23559-[5828.4F]] N75-29405
Vibrations in centrifugal pump units by external systems
[BLL-CE-TRANS-6643-[9022.09]]
N75-29427
The use of Bernstein polynomials in approximating a function and its derivative
[BLL-M-23707-[5828.4F]] N75-29428
Thoughts on miner's fatigue damage rule
[BLL-RAE-TRANS-5027-[1609]]
N75-29448
Experimental test of the load bearing capacity of smooth glass fibre reinforced plastic hollow cylinders subjected to external hydrostatic pressure
[BLL-NEL-TT-2564-[6075.461]]
N75-29463
The application of fracture mechanics to the prediction of the fatigue life of sharply notched components
[BLL-CE-TRAN-6544-[9022.09]]
N75-29470
The control of nitrogen oxide emission from stationary sources
[BLL-RTS-9849] N75-29571
The components of the energy balance of the atmosphere and underlying surface in the northern polar regions
[BLL-M-23619-[5828.4F]] N75-29601
Determination of certain parameters of clouds with the aid of a laser locator
[BLL-M-23632-[5828.4F]] N75-29627
On the methodology of measuring visual range for aviation purposes
[BLL-M-23694-[5828.4F]] N75-29631
Objective methods of forecasting local surface winds
[BLL-M-23690-[5828.4F]] N75-29632
One feature of long term ocean-atmosphere interaction
[BLL-M-23693-[5828.4F]] N75-29633
The role of the tropical zone in processes occuring in the system ocean - atmosphere - continent
[BLL-M-23692-[5828.4F]] N75-29634
Taking cores from unconsolidated sediments of the shelf area using a vibration-hammer corer
[BLL-M-23679-[5828.4F]] N75-29705
An approximate method of solving boundary value problems
[BLL-M-23691-[5828.4F]] N75-29817
Lagrangian description of steady waves
[BLL-M-23564-[5828.4F]] N75-29860
Thermodynamic analysis of direct low-temperature cycles
[BLL-RTS-9548] N75-29935
Cost accounting at large research centers
[BLL-RAE-TRANS-5207-[1765]]
N75-29936
BUNDESMINISTERIUM FUER FORSCHUNG UND TECHNOLOGIE, BONN [WEST GERMANY].
Whell/track technologies
[BMFT-FB-T-74-42] N75-29954
BUREAU OF MINES, BARTLESVILLE, OKLA.
Development and utility of reactivity scales from smog chamber data
[PB-241248/4] N75-29598
Rio Blanco massive hydraulic fracturing demonstration
[PB-240849/0] N75-29614
BUREAU OF MINES, PITTSBURGH, PA.
Chemical flame inhibition using molecular beam mass spectrometry. Computational methods for analyzing flame microstructure
[PB-241245/0] N75-29219
Numerical simulation of flame induced aerodynamics in a coal-mine passageway, semi-empirical model
[PB-240843/3] N75-29379
BUREAU OF MINES, TWIN CITIES, MINN.
Extracting minerals from geothermal brines: A literature study
[PB-240681/7] N75-29545

C

CALIFORNIA EARTH SCIENCE CORP., SANTA MONICA.
Faults on Skylab imagery of the Salton Trough area, Southern California
[E75-10379] N75-29521
CALIFORNIA STATE AIR RESOURCES BOARD, SACRAMENTO.
Determination of the feasibility of the long-range transport of ozone or ozone precursors
[PB-241159/3] N75-29617
CALIFORNIA UNIV., BERKELEY.
An analysis of Lanczos algorithms for symmetric matrices
[AD-A006361] N75-29835
Computation of functions of triangular matrices
[AD-A005916] N75-29838
CALIFORNIA UNIV., LOS ANGELES.
Parametric integer programming
[AD-A006401] N75-29796
Identification of continuous time dynamical systems with unknown noise covariance
[AD-A005885] N75-29816
A large quiescent magnetized plasma for wave studies
[AD-A006461] N75-29900
Parametric instability of the sheath plasma resonance
[AD-A006489] N75-29901
Destabilization of hydromagnetic drift-Alfven waves in a finite pressure collisional plasma
[AD-A006223] N75-29904
CALIFORNIA UNIV., RIVERSIDE.
A laboratory solar flare neutral point experiment
[AD-A005821] N75-29984
CALSPAN CORP., BUFFALO, N.Y.
Wind tunnel model deformation measuring system
[AD-A006390] N75-29138
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 1: Technical report
[PB-240920/9] N75-29783
Performance evaluation of new generation 50th percentile anthropomorphic test devices. Volume 2: Accelerator sled test data
[PB-241121/3] N75-29784
CAMBRIDGE UNIV. [ENGLAND].
The effect of compressibility on unstalled torsional flutter
[ARC-R/M-3754] N75-29040
Activities of the Institute of Astronomy
N75-29966
CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
An ellipsometric investigation of the underpotential deposition of lead on gold
[AD-A005915] N75-29257
Hierarchical models of very large problems, dilemmas, prospects, and an agenda for the future
N75-29847
CENTRAL AEROLOGICAL OBSERVATORY, MOSCOW [USSR].
On the latitudinal variation of the characteristics of the inversion layers in the region of ITCZ in the east Atlantic
N75-29647
Radar investigations of evolution of clouds in the eastern Atlantic
N75-29658
On the effects of thermodynamic conditions on the evolution of convective clouds in the tropical zone of east Atlantic
N75-29660
CENTRAL ELECTRICITY GENERATING BOARD, BERKELEY [ENGLAND].
Electrochemical measurement of carbon potential. Part 4: Studies on some sodium-steel systems at 910K
[RD/B/N-3157] N75-29217
CENTRE DE RECHERCHES SCIENTIFIQUES ET TECHNIQUES DE L'INDUSTRIE DES FABRICATIONS METALLIQUES, BRUSSELS [BELGIUM].
Behavior of four steel lightweight concrete composite beams under long lasting loads
[CRIF-MT-93] N75-29479
CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE [FRANCE].
Thermal control of tethered balloon gondolas
[CNES-NT-10] N75-29096
Results of irradiation tests on various electronic components
[CNES-NT-11] N75-29325
CESSNA AIRCRAFT CO., WICHITA, KANS.
General aviation's future need for research
N75-29021
CHASE ECONOMETRIC ASSOCIATES, INC., BALA CYNWYD, PA.
The macroeconomic impacts of federal pollution control programs
[PB-240979/5] N75-29591
CHEMICAL LAB. RVO-TNO, RIJSWIKJ [NETHERLANDS].
A structure activity study of oximes aiming at prophylaxis against organophosphates
[CL-1974-23] N75-29744
The effect of gases on the conductive properties of organic semiconductors. Part 5: Results for films of chloranil, phenanthrene, phenazine, phtalocyanine [metal free] and crystal violet
[CL-1974-13-PT-5] N75-29917

CHICAGO UNIV., ILL.
Land use forms and the environment. An executive summary
[PB-241093/4] N75-29584
Environmental regulations and energy for home heating
[PB-240699/9] N75-29587
CHRYSLER CORP., NEW ORLEANS, LA.
Reentry static stability characteristics of a [Model 471] .005479-scale 146-inch solid rocket booster tested in the NASA/MSFC 14 by 14 inch TWT [SA8F]
[NASA-CR-141549] N75-29163
Differential elevon effectiveness lateral control optimization and elevon hinge moment investigation on a 0.015 scale space shuttle orbiter model 49-0 [140A/B/C modified] in the AECD VKF wind tunnel A [0A115]
[NASA-CR-141534] N75-29165
CINCINNATI UNIV., OHIO.
Erosion in radial inflow turbines. Volume 5: Computer programs for tracing particle trajectories
[NASA-CR-134787] N75-29109
COLORADO SPRINGS DEPT. OF PUBLIC UTILITIES, COLO.
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240784/9] N75-29552
Assessment of a single family residence solar heating system in a suburban development setting
[PB-240553/8] N75-29570
COLORADO STATE UNIV., FORT COLLINS.
Charge-exchange plasma generated by an ion thruster
[NASA-CR-134844] N75-29175
COLT INDUSTRIES, INC,, WEST HARTFORD, CONN.
Miniaturized high speed controls for turbine engines fabrication and test
[AD-A006108] N75-29125
COLUMBIA UNIV., NEW YORK.
Dynamic response of fluid-filled shells
N75-29273
COMBUSTION, HEAT AND MASS TRANSFER LTD., WIMBLEDON [ENGLAND].
Effect of gravity on methane-air combustion
[NASA-CR-143350] N75-29211
COMMERCE TECHNICAL ADVISORY BOARD, WASHINGTON, D.C.
Review of Project Independence Blueprint: Panel subcommittee reports on FEA-interagency task forces
[COM-75-10500/7] N75-29553
COMPASS SYSTEMS, INC., SAN DIEGO, CALIF.
A ray trace program for the CDC 1604 computer
[AD-A005321] N75-29869
COMPUTER SCIENCES CORP., SILVER SPRING, MD.
Study plan to identify long term national telecommunications need and priorities applying Delphi techniques [handbook]
[NASA-CR-143833] N75-29299
CONTROL DATA CORP., ST. PAUL, MINN.
Results of an aircraft visibility questionnaire concerned with the estimated benefits of airborne proximity warning indicator systems
[AD-A009884] N75-29061
CORNELL UNIV., ITHACA, N.Y.
Coupling considerations for squid devices
[AD-A006324] N75-29345
Redesigning flood management: Project Agnes, phase 1
[PB-241064/5] N75-29544
Magnetic fluids: Magnetic forces and pumping mechanisms
[AD-A006323] N75-29867
CORPS OF ENGINEERS, WALTHAM, MASS.
The use of LANDSAT DCS and imagery in reservoir management and operation
[E75-10378] N75-29520

D

DCF SYSTEMS LTD., TORONTO [ONTARIO].
Data terminal standards and protocols
[CRC-1275] N75-29298
DEFENCE RESEARCH ESTABLISHMENT OTTAWA [ONTARIO].
Studies on pasted silver oxide electrodes suitable for a pile battery
[AD-A006447] N75-29557
DEFENCE RESEARCH ESTABLISHMENT VALCARTIER [QUEBEC].
Preliminary analysis of a light-gas gun-driven gas dynamic laser
[DREV-4011/75] N75-29406
Gigawatt CO2 laser for laser-target interaction studies
[DREV-R-4017/75] N75-29411
Passive mode-locking of a large volume TEA-CO2 laser using an unstable resonator configuration
[DREV-R-4016/75] N75-29412
DEFENCE SCIENTIFIC INFORMATION SERVICE, OTTAWA [ONTARIO].
Implementation of a mini-computer based information system. Part 18. A general file dump program for the Varian 620 computer
[AD-A008519] N75-29945
DEFENSE DEPT., WASHINGTON, D.C.
A study on medical officer career management and retention in the USA armed forces
N75-29729
DEFENSE DOCUMENTATION CENTER, ALEXANDRIA, VA.
Machine-aided retrieval
[AD-A006500] N75-29947
DENVER RESEARCH INST., COLO.
Center for high energy forming
[AD-A006259] N75-29446
DETROIT DIESEL ALLISON, INDIANAPOLIS, IND.
Preliminary design study of a quiet, high flow fan [QHF] stage
[NASA-CR-134780] N75-29433
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN [WEST GERMANY].
Flight safety work of the German Aviation and Space Research Institute
[DLR-MITT-75-05] N75-29070
DOUGLAS AIRCRAFT CO., INC., LONG BEACH, CALIF.
Conceptual design study of advanced acoustic-composite nacelles
[NASA-CR-132703] N75-29093
DREXEL UNIV., PHILADELPHIA, PA.
Rational approximations to the solution of Fredholm integral equations
[AD-A006458] N75-29834
DUGWAY PROVING GROUND, UTAH.
Aerial spray evaluation pine butterfly test, Bitterroot National Forest, Montana, 1973
[AD-A006256] N75-29401

E

EARTH SATELLITE CORP., BERKELEY, CALIF.
A scheme for the uniform mapping and monitoring of earth resources and environmental complexes: An assessment of natural vegetation, environmental, and crop analogs
[E75-10382] N75-29524
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE [SWITZERLAND].
THALIA: A one-dimensional magnetohydrodynamic stability program using the method of finite elements
[LRP-87/74] N75-29823
HYMNIA: Band matrix package for solving eigenvalue problems
[LRP-90/75] N75-29824
ENGINEERING SCIENCES DATA UNIT, LONDON [ENGLAND].
Information on the use of data items in the series bodies 02.04
[ESDU-02.04.00] N75-29028
Transonic data memorandum: Second-order method for estimating the subcritical pressure distribution on a two-dimensional aerofoil in compressible inviscid flow
[ESDU-72025] N75-29029
Estimation of subsonic far-field jet-mixing noise
[ESDU-74002] N75-29103
An introduction to gas turbine exhaust noise
[ESDU-74001] N75-29104
Normal incidence absorption coefficients and acoustic impedances of typical single layer fibrous lining materials
[ESDU-74003] N75-29185
Thermal conductivity of liquid aliphatic hydrocarbons. 1: Alkanes
[ESDU-75003] N75-29193
Thermal conductivity of liquid aromatic compounds containing oxygen
[ESDU-74032] N75-29194
Thermal conductivity of liquid aromatic compounds containing nitrogen
[ESDU-74034] N75-29195
Thermodynamic properties of toluene
[ESDU-74024] N75-29196
Vapour pressures and critical points of pure substances. 4: C1 to C20 alcohols
[ESDU-74023] N75-29197
Thermal conductivity of liquid halogenated aromatic hydrocarbons
[ESDU-74014] N75-29198
Thermal conductivity of liquid aromatic hydrocarbons
[ESDU-74007] N75-29199
Thermodynamic properties of benzene
[ESDU-73009] N75-29200
Vapour pressures of pure substances up to their critical points. 2: C2 to C6 alkenes [monoolefines]
[ESDU-73008] N75-29201
Vapour pressures of pure substances up to their critical points. 3: C6 to C10 alkylbenzenes
[ESDU-73029] N75-29202
Normal melting points, boiling points and critical points of n-alkyl esters of monobasic n-alkanoic acids
[ESDU-71001] N75-29203
Thermal conductivity of liquid n-alkyl aldehydes and ketones
[ESDU-71024] N75-29204
Thermal conductivity of liquid branched chain esters of monobasic alkanoic acids
[ESDU-71022] N75-29205
Normal melting points, boiling points and critical points of n-alkyl aldehydes and ketones
[ESDU-71023] N75-29206
Thermal conductivity of liquid n-alkyl esters of monobasic n-alkanoic acids
[ESDU-71002] N75-29207
Thermal conductivity of liquid monobasic alkanoic acids
[ESDU-72007] N75-29208
Normal melting points, boiling points and critical points of monobasic alkanoic acids
[ESDU-72006] N75-29209
Vapour pressures of pure substances up to their critical points. 1: C1 to C8 alkanes
[ESDU-72028] N75-29210
A guide to the viscosity of liquid petroleum products
[ESDU-71003] N75-29946
Information on the use of data items on struts
[ESDU-01.01.00] N75-29464
Stiffnesses of laminated flat plates
[ESDU-75002] N75-29466
Stress analysis of laminated flat plates
[ESDU-74039] N75-29467
Coefficient of diffusion for a uniform parallel panel
[ESDU-02.05.01] N75-29468
Flat panels in shear. Buckling of long panels with transverse stiffeners
[ESDU-02.03.02] N75-29469
Normal incidence absorption coefficients and acoustic impedances of single layer perforated sheet liners
[ESDU-74004] N75-29868
ENVIRONMENTAL PREDICTION RESEARCH FACILITY [NAVY], MONTEREY, CALIF.
An investigation of interactions between double clouds using a two dimensional numerical model
[AD-A006255] N75-29703
ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
Development and utility of reactivity scales from smog chamber data
[PB-241248/4] N75-29598
ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
Background information for standards of performance: Electric submerged arc furnaces for production of ferroalloys. Volume 1: Proposed standards
[EPA-450/2-74-018A] N75-29573
Report to Congress on control of sulfur oxides
[PB-241021/5] N75-29597
ENVIRONMENTAL PROTECTION AGENCY, WASHINGTON, D.C.
Development document for effluent limitations guidelines and new source performance standards for the steam electric power generating point source category
[PB-240853/2] N75-29575
Development document for effluent limitations guidelines and new source performance standards for the primary aluminum smelting subcategory of the aluminum segment of the nonferrous metals manufacturing point source category
[PB-240859/9] N75-29576
Development document for effluent limitations guidelines and new source performance standards for the synthetic polymer segment of the plastics and synthetic materials manufacturing point source category
[PB-240862/3] N75-29577
Development document for effluent limitations guidelines and new source performance standards for the formulated fertilizer segment of the fertilizer manufacturing point source category
[PB-240863/1] N75-29578
Development document for effluent limitations guidelines and new source performance standards for the phosphorus derived chemicals segment of the phosphate manufacturing point source category
[PB-241018/1] N75-29579
ENVIRONMENTAL QUALITY SYSTEMS, INC., ROCKVILLE, MD.
Characterization of vessel wastes in Duluth-Superior Harbor
[PB-241081/9] N75-29585
ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Recognition map analysis and crop acreage estimation using Skylab EREP data
[E75-10366] N75-29508
Recognition map analysis and crop acreage estimation using Skylab EREP data
[E75-10369] N75-29511

Recognition map analysis and crop acreage estimation
[E75-10375] N75-29517
Recognition map analysis and crop acreage estimation
[E75-10376] N75-29518
Recognition map analysis and crop acreage estimation
[E75-10380] N75-29522
Oil-pollution detection and monitoring from space using ERTS-1
[E75-10381] N75-29523

EUROPEAN SPACE RESEARCH AND TECHNOLOGY CENTER, NOORDWIJK [NETHERLANDS].
ESRO-4 mission and operational programme
[ESRO-TN-116-ESTEC] N75-29158

EUROPEAN SPACE RESEARCH ORGANIZATION, PARIS [FRANCE].
Study of meteorological data processing methods
[ESRO-SP-85] N75-29689
Aerospace Research. Bi-monthly Bulletin No. 1974-1
[ESRO-TT-144] N75-29988
Influence of combustion phenomena on the pogo effect
N75-29989
Transfer matrices of hydraulic systems. Theoretical and experimental study
N75-29990
Examination of combustion stability in a swirling flow combustion chamber
N75-29991
Processing composite materials with a metallic matrix
N75-29992
Conservation forms of gas dynamic equations
N75-29993
A new transient signal analysis unit
N75-29994

EUROPEAN SPACE TECHNOLOGY CENTER, NOORDWIJK [NETHERLANDS].
Habitability design in Europe's spacelab: A status report
N75-29724

EXXON RESEARCH AND ENGINEERING CO., LINDEN, N.J.
Mechanical failure prognosis through oil debris monitoring
[AD-A006190] N75-29459
Sulfate control technology assessment. Phase 1: Literature search and analysis
[PB-240995/1] N75-29589
Evaluation of pollution control in fossil fuel conversion processes: Gasification. Section 1: CO2 acceptor process
[PB-241141/1] N75-29596

F

FACILITY CHECKING SQUADRON [1866TH] [AFCS], RICHARDS-GEBAUR AFB, MO.
TACAN and ILS station evaluation report, Loring AFB, Maine
[AD-A006416] N75-29084

FAIRCHILD REPUBLIC DIV., FARMINGDALE, N.Y.
Space shuttle/food system study. Volume 1: Technical volume, oven study
[NASA-CR-144366] N75-29778
Space shuttle/food system study. Volume 2: Supporting appendices, oven study
[NASA-CR-144367] N75-29779

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
An overview of the FAA engineering and development programs with highlights of fiscal years, 1975-1976
[AD-A010266] N75-29063
Airborne meteorological instrumentation system and data reduction
[AD-A009665] N75-29636

FEDERATION OF ROCKY MOUNTAIN STATES, INC., DENVER, COLO.
A regional land use survey based on remote sensing and other data
[E75-10374] N75-29516

FLUOROCHEM, INC., AZUSA, CALIF.
High energy halogen chemistry
[AD-A006468] N75-29227

FOM-INSTITUUT VOOR PLASMAFYSICA, JUTPHAAS [NETHERLANDS].
Heating and containment of a plasma in a small tokamak device
[REPT-74-87] N75-29549

FREIE UNIV., BERLIN [WEST GERMANY].
Metorological data. Volume 141, no. 9: Results of synoptic services in 1974. Daily and monthly weather maps [surface, 850 millibars, 500 millibars], tables and brief scientific articles, September
N75-29628
Meteorological data. Volume 138, no. 2: Daily altitude charts of the 30 millibar level and mean monthly charts for 1973. Parts 3 and 4, 3rd and 4th. Quarters stratosphere working group
N75-29629
Meteorological data. Volume 145, no. 2: The European climatology for 1974. Meteorological satellite data from the Berlin zone of reception part 2, 2nd quarter
N75-29630

G

GATE OPERATIONAL CONTROL CENTRE, DAKAR [SENEGAL].
The low-level structure of an African disturbance determined by aircraft reconnaissance
N75-29640
Atmospheric disturbances over the Atlantic GATE area as seen from satellite data
N75-29642
Cloud cluster formation over monsoon Africa
N75-29649
The quality of upper air observations in the GATE B-area
N75-29652
Observations on convective clouds over the tropical Atlantic
N75-29653
On microstructure of clouds in the eastern zone of the Atlantic
N75-29654
Preliminary analysis of a selective sample of GATE ship and aircraft data
N75-29659
Rapid structural changes in an asymmetrical tropical depression
N75-29661
On the wind, temperature, and humidity fields in the vicinity of an east-west line of showers
N75-29662
Case study of the physical structure of individual cumulo nimbus [mission 226-4, type 8B2]
N75-29663
Identification, tracking, and sources of Saharan dust: An inquiry using SMS
N75-29664
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 1: Reflection indicatrix
N75-29670
Aircraft measurements of reflected solar radiation angular and spectral characteristics in GATE program. Part 2: The spectral albedo
N75-29671
On the relation between optical and aerosol characteristics of the east Atlantic atmosphere
N75-29673
Infrared radiation budget of the Harmattan haze
N75-29674

GENERAL ELECTRIC CO., HOUSTON, TEX.
Shuttle checkout software system application verification laboratory manual
[NASA-CR-144378] N75-29169

GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Investigation of high power MHD gas lasers
[AD-A006298] N75-29420

GENERAL ELECTRIC CO., SYRACUSE, N.Y.
Computer-aided amplifier design in BASIC
[AD-A006370] N75-29331
The availability, reliability and maintainability of redundant systems
[AD-A006369] N75-29455

GENERAL RESEARCH CORP., MCLEAN, VA.
CARMONETTE. Volume 1. General description
[AD-A007843] N75-29806
CARMONETTE. Volume 2. Data preparation
[AD-A007844] N75-29807
CARMONETTE. Volume 3. Technical documentation
[AD-A007845] N75-29808

GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
Science, technology, and detente
[PB-240818/5] N75-29949

GEORGIA INST. OF TECH., ATLANTA.
Audible and ultrasonic acoustic emissions from composite solid propellants
[AD-A005714] N75-29268
A study to analyze six band multispectral images and fabricate a Fourier transform detector
[NASA-CR-120684] N75-29368
Some notions of decentralization and coordination in large-scale dynamic systems
N75-29854

GERMANTOWN LABS., INC., PHILADELPHIA, PA.
Experimental and flight evaluation of the titanium tetrachloride water methanol system for the production of smoke trails
[AD-A006126] N75-29702

GIANNINI SCIENTIFIC CORP., SANTA ANA, CALIF.
Electric arc light source having undercut recessed anode
[NASA-CASE-ARC-10266-1] N75-29318
Combination automatic-starting electrical plasma torch and gas shutoff valve
[NASA-CASE-XLE-10717] N75-29426

GOODYEAR AEROSPACE CORP., AKRON, OHIO.
Associative array processing for topographic data reduction
[AD-A006198] N75-29543

GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
User's guide for a revised computer program to analyze the LRC 16 foot transonic dynamics tunnel active cable mount system
[NASA-CR-132692] N75-29130
Tracked levitated research vehicle periodic test summary report: Primary suspension; aeropropelled
[PB-240994/4] N75-29957

H

H H AEROSPACE DESIGN CO., ELMSFORD, N.Y.
Survey of sonic boom phenomena for the non-specialist
[AD-A009663] N75-29113

HAHN-MEITNER-INSTITUT FUER KERNFORSCHUNG, BERLIN [WEST GERMANY].
Constructive methods for solving delta sub 4, sup 2 u + A delta sub 4 u sub T + C delta sub 4 u + D u equals 0
[AD-A006261] N75-29839

HAMBURG UNIV. [WEST GERMANY].
Bulk aerodynamic description of turbulent fluxes at the surface with and without precipitation
N75-29668
Preliminary report on determination of fluxes by direct and profile method during intercomparison 2A
N75-29669

HARRY DIAMOND LABS., WASHINGTON, D.C.
Analysis of the ground term energy levels for triply ionized neodymium in yttrium orthovanadate
[AD-A006017] N75-29873

HARVARD COLL. OBSERVATORY, CAMBRIDGE, MASS.
Theoretical and experimental studies in ultraviolet solar physics
[NASA-CR-143270] N75-29977

HARVARD UNIV., CAMBRIDGE, MASS.
An informal paper on large-scale dynamic systems
N75-29848

HATFIELD POLYTECHNIC [ENGLAND].
The effect of mean stress on the fatigue of aluminum alloys
[S/T-MEMO-9/74] N75-29482

HEINRICH-HERTZ-INSTITUTE FUER SCHWINGUNGSFORSCHUNG, BERLIN [WEST GERMANY].
Applications of the PARCOR coefficients for linear prediction of stationary processes
[TB-173] N75-29302

HOLOSONICS, INC., RICHLAND, WASH.
Solid rocket motor inspection by acoustical holography techniques
[AD-A006236] N75-29179

HONEYWELL RADIATION CENTER, LEXINGTON, MASS.
Silicon star sensor
[AD-A006482] N75-29402

HOUSTON UNIV., TEX.
Future utilization of space: Silverton Conference on material science and phase transformations in zero-gravity, summary of proceeding
[NASA-CR-141936] N75-29908

HUGHES AIRCRAFT CO., CULVER CITY, CALIF.
Experiment definition phase shuttle laboratory LDRL-10.6 experiment
[NASA-CR-144656] N75-29164
Electronically steerable millimeter wave antenna techniques for space shuttle applications
[NASA-CR-143813] N75-29291
Methods of handling sequence effects in human factors engineering experiments
[AD-A006240] N75-29770

HUGHES AIRCRAFT CO., EL SEGUNDO, CALIF.
Experiment definition phase shuttle laboratory: LDRL-10.6 experiment
[NASA-CR-144658] N75-29161
Nickel hydrogen energy storage satellites
[AD-A006427] N75-29567

HUGHES AIRCRAFT CO., FULLERTON, CALIF.
Variable pulse width modulator exploratory development model
[AD-A006258] N75-29334
Acoustic signal processing devices [surface wave transducer study]
[AD-A006257] N75-29335

HUGHES RESEARCH LABS., MALIBU, CALIF.
Waveguide gas laser
[AD-A006410] N75-29416
COAT measurements and analysis
[AD-A006105] N75-29890
The performance of edge operators on images with texture
[AD-A006230] N75-29891

HYDROMETEOROLOGICAL CENTRE OF THE USSR [MOSCOW].
Cloud cover dynamics over the tropical Atlantic during the GATE first observing period
N75-29648
On the orders of the values of the meteorological elements obtained in the A/B array in the period of GATE
N75-29650
HYDROMETEOROLOGICAL SCIENTIFIC RESEARCH CENTER [USSR].
On some questions of interaction between the Ocean and atmosphere in the northern part of A/B scale
N75-29682
HYDROMETEOROLOGICAL SERVICE OF THE USSR.
On characteristic time scales of meteorological fields in the tropical Atlantic zone
N75-29645
On modulation interaction of the various scale waves in the Atlantic tropical zone
N75-29646
Turbulent characteristic measurements in the marine boundary layer during GATE
N75-29667

I

IBM FEDERAL SYSTEMS DIV., HUNTSVILLE, ALA.
Low cost computer subsystem for the Solar Electric Propulsion Stage [SEPS]
[NASA-CR-120671] N75-29174
IBM WATSON RESEARCH CENTER, YORKTOWN HEIGHTS, N.Y.
Decentralized regulation of dynamic systems
N75-29851
Investigation of ion implantation as a doping technique for the 3-5 semiconductors and ternary alloy systems
[AD-A006465] N75-29926
IDAHO UNIV., MOSCOW.
Stability and transient motion of a hydrodynamic horizontal three-lobe bearing system
N75-29275
IIT RESEARCH INST., CHICAGO, ILL.
Spectral analysis of Doppler MLS video data
[AD-A006436] N75-29072
ILLINOIS UNIV., CHICAGO.
Numerical techniques for electromagnetic scattering
[AD-A006459] N75-29312
ILLINOIS UNIV., SAVOY.
Pattern and motion characteristics of visually time-compressed target detection in static noise
[AD-A006384] N75-29307
Manipulating the number and type of adaptive variables in training
[AD-A006229] N75-29764
The measurement of operator capacity by manipulation of dual task demands
[AD-A006352] N75-29765
Man as a precious resource: The enhancement of human effectiveness in flight operations
[AD-A006353] N75-29766
ILLINOIS UNIV., URBANA.
Fatigue data bank and data analysis investigation, phase I
[PB-240261/8] N75-29254
Energy intensity of barge and rail freight hauling
[PB-240012/5] N75-29269
BURP: A bundle repeater and restorer
[AD-A006354] N75-29330
Fatigue behavior of welded reinforcement in reinforced concrete beams
[PB-240367/3] N75-29500
Transport processes of particles in dilute suspensions in turbulent water flow, phase 3
[PB-239790/9] N75-29586
Some aspects of control of a large-scale dynamic system
N75-29855
IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON [ENGLAND].
Apparatus and programs for digital analysis of fluctuating quantities in turbulent flow
[IC-AERO-74-09] N75-29793
INDIANA UNIV., BLOOMINGTON.
Complete families of solutions for parabolic equations with analytic coefficients
[AD-A005820] N75-29829
Convergence of higher order pseudoparabolic partial differential equations
[AD-A005823] N75-29830
The approximation of solutions to initial-boundary value problems for parabolic equations in one space variable
[AD-A006233] N75-29831
Integral operators for parabolic equations and their application
[AD-A006244] N75-29833
Constructive methods for solving delta sub 4, sup 2 u + A delta sub 4 u sub T + C delta sub 4 u + D u equals 0
[AD-A006261] N75-29839
INDUSTRIAL BIO-TEST LABS., INC., NORTHBROOK, ILL.
Feasibility of 5 gpm dynactor/magnetic separator system to treat spilled hazardous materials
[PB-241080/1] N75-29590
INSTITUTE FOR PERCEPTION RVO-TNO, SOESTERBERG [NETHERLANDS].
Deterministic multiple cue learning. Part 1: Effects of cue intercorrelation and presentation order
[IZF-1974-20-PT-1] N75-29760
On context effects in short term retention
[IZF-1974-28] N75-29761
Misperception of exponential growth. Part 1: Numerical stimuli
[IZF-1974-29-PT-1] N75-29762
Misperception of exponential growth. Part 2: Graphical stimuli
[IZF-1974-30-PT-2] N75-29763
INSTITUTE FOR TELECOMMUNICATION SCIENCES, BOULDER, COLO.
Analysis of problems in the application of radar sensors to automotive collision prevention
[PB-240950/6] N75-29317
INSTITUTO DE INVESTIGACIONES CIENTIFICAS Y TECNICAS DE LAS FUERZAS ARMADAS [CITEFA], BUENOS AIRES [ARGENTINA].
Fundamentals of holographic interferometry
[REPT-182] N75-29409
INSTITUTO NACIONAL DE TECNICA AEROESPACIAL, MADRID [SPAIN].
Overall reaction rate and stoichiometry for thermal decomposition of hydrazine
N75-29266
Dispersion relation for electron waves propagating in an isotropic plasma containing Maxwellian and suprathermal electrons
N75-29881
INTEGRATED SYSTEMS SUPPORT, INC., FALLS CHURCH, VA.
A production environment evaluation of interactive programming
[AD-A006502] N75-29795
INTERNATIONAL BUSINESS AND RESEARCH, INC., CORAL GABLES, FLA.
Project Stormwater: The collection of bathythermographic data and airborne radiation sea surface temperature measurements in the wake of hurricane Irah
[AD-A005909] N75-29717
INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, ROME [ITALY].
Preliminary scientific results of the GARP Atlantic tropical experiment, volume 2
[GATE-14-VOL-2] N75-29639
IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
A proposed university/industry/government cooperative aero educational program
N75-29018
Numerical computation of three-dimensional blunt body flow fields with an impinging shock
[NASA-CR-143312] N75-29038
Water and vinyl trichlorosilane vapor interactions with E-glass fibers
[AD-A005088] N75-29218
IOWA UNIV., IOWA CITY.
Electron angular distributions above the dayside auroral oval
[NASA-CR-143267] N75-29604
ISRAEL PROGRAM FOR SCIENTIFIC TRANSLATIONS, LTD., JERUSALEM.
Transition from deflagration to detonation in condensed phases
[TT-74-50028] N75-29213
ISTITUTO SUPERIORE DI SANITA, ROME [ITALY].
High-energy beams and magnetic spectrometers
[ISS-L-74/8] N75-29861
Modulation spectroscopy of layer semiconductors GaSe and GaTe
[ISS-L-74/2] N75-29911
Weak non leptonic decays of charmed hadrons
[ISS-P-75/4] N75-29912
Automatic generation of identification records for archives building
[ISS-T-74/6] N75-29941
ITALIAN AIR FORCE AEROSPACE MEDICAL CENTER, ROME.
Preliminary research on body displacement during lunar walking
N75-29726

J

JET PROPULSION LAB., CALIF. INST. OF TECH., PASADENA.
Cryostat system for temperatures on the order of 2 deg K or less
[NASA-CASE-NPO-13459-1] N75-29277
The deep space network
[NASA-CR-143289] N75-29289
Method and apparatus for background signal reduction in opto-acoustic absorption measurement
[NASA-CASE-NPO-13683-1] N75-29383
JOHNS HOPKINS UNIV., BALTIMORE, MD.
Complete identification of a class of nonlinear systems from steady state frequency response
[AD-A005829] N75-29814
JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
On an airplane in outer space
[NASA-TT-F-16423] N75-29087
Stellar diary
[NASA-TT-F-16376] N75-29142
A month on Salyut-4
[NASA-TT-F-16419] N75-29143
Process for the preparation of sintered ceramics on a silicon nitride basis
[NASA-TT-F-16439] N75-29262
Organization and planning of telecommunications enterprises
[JPRS-65331] N75-29295
Information content of the data obtained by remote sensing of the parameters of the environment and the earth's resources from space
[NASA-TT-F-16435] N75-29533
How to build Gulliver's watch [biosphere model]
[NASA-TT-F-16455] N75-29606
Dinner for a cosmonaut
[NASA-TT-F-16465] N75-29772
A cosmic model of the biosphere
[NASA-TT-F-16460] N75-29968

K

KANNER [LEO] ASSOCIATES, ANNAPOLIS, MD.
Vibration as an artificially created human factor of the environment
[NASA-TT-F-16475] N75-29776
KANNER [LEO] ASSOCIATES, REDWOOD CITY, CALIF.
Experimental and theoretical investigations on the problem of propeller/wing interference up to high angles of attack
[NASA-TT-F-16490] N75-29035
Soyuz 14: Salyut-3 flight
[NASA-TT-F-16466] N75-29140
Optimization of plane fin-tube radiator for spacecraft energy supply
[NASA-TT-F-16473] N75-29171
Hot corrosion in burner gas at 1200 C
[NASA-TT-F-16509] N75-29245
A new concept of modeling the process of heat transfer on surfaces with artificial roughnesses and microfins
[NASA-TT-F-16506] N75-29357
The disturbance of the mixing region of two planar jets by means of a shock wave
[NASA-TT-F-16507] N75-29358
Chemical controls for sterilization in autoclaves
[NASA-TT-F-16478] N75-29718
Chemical controls for dry heat sterilization
[NASA-TT-F-16321] N75-29719
Certain characteristic features of flowering and pollination in duckweeds [Lemnaceae S. Gray]
[NASA-TT-F-16483] N75-29721
Newest methods of air distribution in conditioning systems on naval transport vessels
[NASA-TT-F-16498] N75-29775
Status and prospects for the development of air conditioning for naval vessels
[NASA-TT-F-16457] N75-29777
Robot manipulators
[NASA-TT-F-16482] N75-29780
Allocation methodology. Distance determinations and population catchment determinations, and their applicability to practical planning
[NASA-TT-F-16495] N75-29856
Why are there so few X-ray stars?
[NASA-TT-F-16296] N75-29971
KANSAS UNIV., LAWRENCE.
The ME/DE degree at the University of Kansas
N75-29017
KIEL UNIV. [WEST GERMANY].
Variations of temperature, salinity and currents in the mixed layer and the thermocline [preliminary results]
N75-29681
KINERGETICS, INC., TARZANA, CALIF.
Improved mine rescue breathing apparatus
[PB-241105/6] N75-29787

L

LABORATOIRE DE RECHERCHES BALISTIQUES ET AERODYNAMIQUES, VERNON [FRANCE].
Ball bearings for inertial type gyroscopes: Low speed operation study
[LRBA-E-602-NT-26/SIE] N75-29437
LIFE SYSTEMS, INC., CLEVELAND, OHIO.
Evaluation of the electrochemical O2 concentrator as an O2 compressor
[NASA-CR-137688] N75-29436

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Improved MTI radar signal processor
[AD-A010478] N75-29075
DABS link performance considerations
[AD-A009429] N75-29078
Further studies of ATCRBS based on ARTS-3 derived data
[AD-A005568] N75-29079
An analysis of aircraft L-band beacon antenna patterns
[AD-A005569] N75-29287
Some characteristics of a communication satellite multiple-beam antenna
[AD-A006405] N75-29311
Development of tunable semiconductor lasers for application to air pollution measurements
[PB-241030/6] N75-29423
Seismic discrimination
[AD-A006194] N75-29624
High resolution spectral estimates
[AD-A006406] N75-29946
LINKABIT CORP., LOS ANGELES, CALIF.
Study of efficient video compression algorithms for space shuttle applications
[NASA-CR-137708] N75-29294
LITTLE [ARTHUR D.], INC., CAMBRIDGE, MASS.
Flame resistant elastomeric polymer development
[NASA-CR-144362] N75-29264
Technology and current practices for processing, transferring and storing liquefied natural gas
[PB-241048/8] N75-29271
Radiation cooler for 10 micrometer wavelength engineering model receiver model no. 7172, serial no. 201
[NASA-CR-144662] N75-29362
Economic impact of shortages on the fertilizer industry
[PB-240418/4] N75-29953
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
The next forty years in aviation
N75-29007
LOCKHEED ELECTRONICS CO., HOUSTON, TEX.
AST-6/CSM training console operations manual
[NASA-CR-144370] N75-29137
Users guide for the shuttle mass properties automated system
[NASA-CR-144371] N75-29145
Test plan/procedure for the checkout of the USA cable communications test configuration for the electromagnetic compatibility [EMC] tests
[NASA-CR-144369] N75-29293
Functional design specification for Stowage List And Hardware Tracking System [SLAHTS]
[NASA-CR-144368] N75-29942
Functional design specification for the problem data system
[NASA-CR-144358] N75-29943
LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
An experimental study of reaction profiles in porous electrodes.
[AD-A005773] N75-29341
LOUGHBOROUGH UNIV. OF TECHNOLOGY [ENGLAND].
Passenger conveyor economics: Costs, capacity and user benefits
[TT-7409] N75-29069
Optimal control concepts in the design of turbine blades and blades
N75-29274
Response of thin-walled cylinders to aerodynamic excitation, part 1
[TT-7413-PT-1] N75-29480
Response of thin-walled cylinders to aerodynamic excitation, part 2
[TT-7413-PT-2] N75-29481
Behavioural observations of passengers boarding a slow speed conveyor
[TT-7411] N75-29759
A direct method for the generation of shape functions of any desired continuity for rectangular finite elements
[TT-7501] N75-29822
LOVELACE FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH, ALBUQUERQUE, N.MEX.
Effects of 60 Co on electrical self-stimulation of the brain and blood pressure
[AD-A006428] N75-29751
LOWELL OBSERVATORY, FLAGSTAFF, ARIZ.
UBV photometry of asteroid 433 Eros
[NASA-CR-143316] N75-29963
LTV AEROSPACE CORP., DALLAS, TEX.
Developments in convective heat transfer models featuring seamless and selected detail surfaces, employing electroless plating
[NASA-CR-144364] N75-29356
LUND UNIV. [SWEDEN].
Width measurements on short tracks of cosmic ray nuclei in nuclear emulsion
[LUIP-CR-74-13] N75-29987

M

MAGNETIC CORP. OF AMERICA, WALTHAM, MASS.
Short-pulse switches for airborne high-power supplies
[AD-A006107] N75-29340
MAIN GEOPHYSICAL OBSERVATORY, LENINGRAD [USSR].
On a principle of validation of the meteorological observation results in GATE-74
N75-29651
MAINZ UNIV. [WEST GERMANY].
The cool skin of the ocean
N75-29666
MAN-ACOUSTICS AND NOISE, INC., SEATTLE, WASH.
Establishing certification/design criteria for advanced supersonic aircraft utilizing acceptance, interference, and annoyance response to simulated sonic booms by persons in their homes
[AD-A009656] N75-29090
MARCONI CO. LTD., CHELMSFORD [ENGLAND].
Design, manufacture and test of an electrical model of a shaped beam antenna for a maritime satellite
[ESRO-CR[P]-644] N75-29303
MARTIN MARIETTA CORP., BALTIMORE, MD.
Ground truth data for test sites [SL-3]
[NASA-CR-141911] N75-29531
Ground truth data for test sites [SL-4]
[NASA-CR-141912] N75-29532
MARTIN MARIETTA CORP., DENVER, COLO.
Skylab program payload integration. Skylab film environmental effects
[NASA-TM-X-64951] N75-29387
MARTIN MARIETTA LABS., BALTIMORE, MD.
Effects of environment on the mechanical behavior of metals
[AD-A006299] N75-29260
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Engineering education for the 1980's: A speculation
N75-29024
Vapor deposition apparatus
[NASA-CASE-HQN-10462] N75-29192
Study of water absorption lines in the near infrared
[AD-A005636] N75-29234
Wind tunnel generation of sinusoidal lateral and longitudinal gusts by circulation of twin parallel airfoils
[NASA-CR-137547] N75-29351
High speed reacting and radiating flows
[AD-A006460] N75-29374
Atmospheric measurements at millimeter wavelengths
[AD-A006128] N75-29626
Cable strumming experiments
[AD-A005894] N75-29715
CAMAC: Group manipulation system
[PB-240495/2] N75-29798
Survey of decentralized control methods
N75-29849
Analysis of the capability and limitations of relativistic gravity measurements using radio astronomy methods
[NASA-CR-120687] N75-29962
Chemical, mineralogical and textural systematics of non-mare melt rocks: Implications for lunar impact and volcanic processes
[NASA-CR-143285] N75-29974
MATHEMATICS AND COMPUTATION LAB., MCLEAN, VA.
The MCL-Thurow model supplement
[PB-241113/0] N75-29952
MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN [WEST GERMANY].
Investigations on the behavior of excited methylfluoride molecules in proximity of atoms
[REPT-8/1974] N75-29872
MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON BEACH, CALIF.
Design and evaluation of thermodynamic vent/screen baffle cryogenic storage system
[NASA-CR-134810] N75-29278
MCDONNELL-DOUGLAS ASTRONAUTICS CO., ST. LOUIS, MO.
A leading edge heating array and a flat surface heating array - operation, maintenance and repair manual
[NASA-CR-144357] N75-29088
Simulation verification techniques study
[NASA-CR-144356] N75-29132
Evaluation and study of advanced optical contamination, deposition, measurement, and removal techniques
[NASA-CR-144376] N75-29135
Particulate contamination spectrometer. Volume 1: Technical report
[NASA-CR-144375] N75-29407
MCDONNELL-DOUGLAS CORP., ST. LOUIS, MO.
Current and future opportunities in aeronautical engineering
N75-29004
MCGILL RADAR WEATHER OBSERVATORY, STE. ANNE DE BELLEVUE [QUEBEC].
Rain attenuation studies
[AD-A006123] N75-29310
MCGILL UNIV., MONTREAL [QUEBEC].
Characterization of optimality in convex programming without a constraint qualification
[AD-A005903] N75-29800
MECHANICAL TECHNOLOGY, INC., LATHAM, N.Y.
A theoretical and experimental investigation of the magnetic fields and forces arising in magnetic suspension systems
[AD-A006109] N75-29443
MEDICAL BIOLOGICAL LAB. RVO-TNO, RIJSWIJK [NETHERLANDS].
A structure activity study of oximes aiming at prophylaxis against organophosphates
[CL-1974-23] N75-29744
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN [WEST GERMANY].
Jupiter orbiter. Study of critical aspects of a joint ESA/NASA project
[MBB-UR-V-77-74] N75-29975
METEOROLOGY RESEARCH, INC., ALTADENA, CALIF.
Determination of the feasibility of the long-range transport of ozone or ozone precursors
[PB-241159/3] N75-29617
MICHIGAN STATE UNIV., EAST LANSING.
Investigation of Skylab data
[E75-10363] N75-29505
MICHIGAN UNIV., ANN ARBOR.
The impact between a liquid drop and an elastic half-space
[PB-241155/1] N75-29378
Fiber reinforced solids possessing great fracture toughness: The role of interfacial strength
[NASA-CR-143287] N75-29474
Basic biomechanical properties of the human neck related to lateral hyperflexion injury
[PB-241246/8] N75-29747
MILITARY AIRCRAFT STORAGE DISPOSITION CENTER, DAVIS-MONTHAN AFB, ARIZ.
Desert storage test program
[AD-A006103] N75-29454
MINNESOTA UNIV., MINNEAPOLIS.
A parachute opening shock theory based on nonlinear time histories of inflow velocity and projected area
[AD-A005271] N75-29057
MISSION RESEARCH CORP., SANTA BARBARA, CALIF.
Low fluence calculation of photoelectron flux densities outside an emitting sphere
[AD-A005825] N75-29866
MISSISSIPPI STATE UNIV., STATE COLLEGE.
Application of remote sensing to state and regional problems
[E75-10372] N75-29514
MITRE CORP., ATLANTIC CITY, N.J.
Discrete address beacon system/air traffic control interface configuration document. Volume 2: Enroute hardware for phase 1
[AD-A009307] N75-29081
MITRE CORP., BEDFORD, MASS.
AFBITS experimental equipment evaluations
[AD-A006192] N75-29309
Remote-terminal emulator [design verification model]: User's Manual
[AD-A006193] N75-29804
MITRE CORP., MCLEAN, VA.
Civil aviation midair collisions analysis: 1972 added to 1964 - 1971 results
[AD-A005897] N75-29064
Vortex-related accidents over the ten year period 1964 - 1973
[AD-A010111] N75-29065
Intermittent positive control computer algorithm for test bed experiments
[AD-A009215] N75-29068
Statistical summary of the 1983 Los Angeles enroute center standard traffic model
[AD-A009011] N75-29073
Aeronautical satellite [AEROSAT] program related bibliography
[AD-A005987] N75-29154

N

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D.C.
Principles for evaluating chemicals in the environment
[PB-240916/7] N75-29595
NATIONAL AERONAUTICAL ESTABLISHMENT, OTTAWA [ONTARIO].
Nonlinear spatial wave development in an axisymmetrical turbulent jet
[NRC-14756] N75-29364

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Assessing and controlling the effect of aircraft on the environment: Pollution N75-29009
On wake vortex alleviation N75-29010
Computational aerodynamics N75-29013
Curriculum for modern aeronautics N75-29023
The accuracy of far-field noise obtained by the mathematical extrapolation of near-field noise data [NASA-TM-X-62434] N75-29067
Electric arc light source having undercut recessed anode [NASA-CASE-ARC-10266-1] N75-29318
Trielectrode capacitive pressure transducer [NASA-CASE-ARC-10711-2] N75-29320
G-load measuring and indicator apparatus [NASA-CASE-ARC-10806-1] N75-29381
A hot-wire surface gage for skin friction and separation detection measurements [NASA-TM-X-62465] N75-29384
Large scale dynamic systems [NASA-SP-371] N75-29845
Simulation of large-scale dynamic systems N75-29846
Digital simulation of V/STOL aircraft for autopilot research N75-29853
Direct observation of small cluster mobility and ripening [NASA-TM-X-62456] N75-29915
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
Status and trends in active control technology N75-29015
An improved fifth wheel [NASA-CASE-FRC-10081-1] N75-29432
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Cyclical bi-directional rotary actuator [NASA-CASE-GSC-11883-1] N75-29430
A vector-dyadic development of the equations of motion for N-coupled flexible bodies and point masses [NASA-TN-D-8047] N75-29857
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, LANGLEY STATION, VA.
NASA/University Conference on Aeronautics [NASA-SP-372] N75-29001
Trends in aircraft noise control N75-29008
Airborne electronics for automated flight systems N75-29011
Some trends in aircraft design: Structures N75-29014
Opportunities for aerodynamic-drag reduction N75-29016
University research in aeronautics N75-29020
A numerical determination of the bow shock wave in transonic axisymmetric flow about blunt bodies [NASA-TM-X-72448] N75-29033
Effort of spanwise variation of turbulence on the normal acceleration of airplanes with small span relative to turbulence scale [NASA-TM-X-72748] N75-29036
Vibrations measured in the passenger cabins of two jet transport aircraft [NASA-TN-D-7923] N75-29037
Extraction from flight data of longitudinal aerodynamic coefficients in maneuvering flight for F-8C aircraft [NASA-TN-D-8019] N75-29039
The effect of wing dihedral and section suction distribution on vortex bursting [NASA-TM-X-72745] N75-29091
Crack growth in Ti-8Al-1Mo-1V with real-time and accelerated flight by flight loading [NASA-TM-X-72754] N75-29092
Annoyance resulting from intrusion of aircraft sounds upon various activities [NGR-43-008-008] N75-29112
A computer program for helicopter rotor noise using Lowson's formula in the time domain [NASA-TM-X-72759] N75-29116
Baseline measurement of the noise generated by a short-to-medium range jet transport flying standard ILS approaches and level flyovers [NASA-TM-X-72760] N75-29119
Premission and postmission simulation studies of the foot-controlled maneuvering unit for Skylab experiment T-020 [NASA-TN-D-7963] N75-29153
Automated Mars surface sample return mission concepts for achievement of essential scientific objectives [NASA-TM-X-3184] N75-29156
A method of preparing aromatic polyimides having uniquely low softening temperatures [NASA-CASE-LAR-11828-1] N75-29181
Recent NASA progress in composites [NASA-TM-X-72713] N75-29188
Polyimide adhesives [NASA-CASE-LAR-11397-1] N75-29263
Crossflow in two-dimensional asymmetric nozzles [NASA-TN-D-7999] N75-29365
Particulate and solar radiation stable coating for spacecraft [NASA-CASE-LAR-10805-2] N75-29431
Human comfort response to random motions with a dominant vertical motion [NASA-TM-X-72691] N75-29774
Evaluation of the present theoretical basis for determination of planetary surface properties by earth-based radar [NASA-TN-D-7889] N75-29965
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
The long term energy problem and aeronautics N75-29012
Summary of model VTOL lift fan tests conducted at NASA Lewis Research Center [NASA-TM-X-71778] N75-29106
Experimental verification of film-cooling concepts on a turbine vane [NASA-TM-X-71777] N75-29107
Application of real-time engine simulations to the development of propulsion system controls [NASA-TM-X-71764] N75-29108
Potential and viscous flow prediction in V/STOL propulsion system inlets [NASA-TM-X-71776] N75-29110
Evaluation by step response tests of prototype relief valves designed for YF-12 inlet stability bleed system [NASA-TM-X-3262] N75-29118
A throat-bypass stability system for a YF-12 aircraft research inlet using self-acting mechanical valves [NASA-TM-X-71779] N75-29128
Cost performance satellite design using queueing theory [NASA-TM-X-71770] N75-29155
Power processing for electric propulsion [NASA-TM-X-71775] N75-29172
Propulsion technology needs for advanced space transportation systems [NASA-TM-X-71783] N75-29173
Effect of magnesium oxide content on oxidation behavior of some superalloy-base cermets [NASA-TM-X-3265] N75-29187
Hot corrosion evaluation of aluminide coated superalloys in support of an ASTM Round Robin program [NASA-TM-X-71734] N75-29240
The feasibility of ranking material fracture toughness by ultrasonic attenuation measurements [NASA-TM-X-71769] N75-29241
Structure and thermal cycling stability of a hafnium monocarbide reinforced directionally solidified cobalt-base eutectic alloy [NASA-TM-X-71751] N75-29242
Directionally solidified pseudo-binary eutectics of Ni-Cr-[Hf, Zr] [NASA-TM-X-71765] N75-29243
Fretting of titanium at temperatures to 650 C in air [NASA-TN-D-8048] N75-29250
Performance characteristics of the 12 GHz, 200 watt transmitter experiment package for CTS [NASA-TM-X-71773] N75-29284
Experimentally determined aeroacoustic performance and control of several sonic inlets [NASA-TM-X-71767] N75-29353
Combination automatic-starting electrical plasma torch and gas shutoff valve [NASA-CASE-XLE-10717] N75-29426
Operating limitations of high speed jet lubricated ball bearings [NASA-TM-X-71678] N75-29429
Analysis of dynamic capacity of low-contact-ratio spur gears using Lundberg-Palmgren theory [NASA-TN-D-8029] N75-29434
Comparison of pitting fatigue life of ausforged and standard forged AISI M-50 and AISI 9310 spur gears [NASA-TN-D-8030] N75-29435
Fracture testing with surface crack specimens [NASA-TM-X-71772] N75-29473
The 100 kW experimental wind turbine generator project [NASA-TM-X-71758] N75-29546
Controlled generation of large volumes of atmospheric clouds in a ground-based environmental chamber [NASA-TM-X-3266] N75-29638
Electrical characteristics of a free-burning direct-current argon arc operating between 90 and 563 kilowatts with two types of cathodes [NASA-TN-D-8032] N75-29896
Wear and interfacial transport of material [NASA-TM-X-71781] N75-29909
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Thrust measurement [NASA-CASE-XMS-05731] N75-29382
Atmospheric transmission computer program CP [NASA-TM-X-58137] N75-29602
Concept design of the payload handling manipulator system [NASA-TM-X-72447] N75-29773
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Combined docking and grasping device [NASA-CASE-MFS-23088-1] N75-29160
Carbon monoxide monitor [NASA-CASE-MFS-22060-1] N75-29380
Skylab program payload integration. Skylab film environmental effects [NASA-TM-X-64951] N75-29387
Thermal energy storage systems [NASA-CASE-MFS-23167-1] N75-29547
Solar energy power system [NASA-CASE-MFS-21628-2] N75-29548
The structure of robust observers [NASA-TM-X-64950] N75-29819
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Method of heat treating age-hardenable alloys [NASA-CASE-XNP-01311] N75-29236
Cryostat system for temperatures on the order of 2 deg K or less [NASA-CASE-NPO-13459-1] N75-29277
Method and apparatus for background signal reduction in opto-acoustic absorption measurement [NASA-CASE-NPO-13683-1] N75-29383
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WALLOPS STATION, WALLOPS ISLAND, VA.
Free radical OH, a molecule of astrophysical and aeronomic interest [NASA-SP-373] N75-29960
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D.C.
Aeronautics in the American Society N75-29002
Vapor deposition apparatus [NASA-CASE-HQN-10462] N75-29192
A summary of Skylab findings of interest to life scientists N75-29725
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 142 [NASA-SP-7011(142)] N75-29735
NATIONAL AEROSPACE LAB., AMSTERDAM [NETHERLANDS].
The effect of a pylon-mounted nacelle on the flutter behaviour of a wing-pylon-nacelle configuration [NLR-TR-74125-U] N75-29056
Fatigue crack propagation data for titanium sheet alloys: IMI 318 [NLR-TR-74048-U] N75-29252
Fractography of fatigue crack propagation in 2024-T3 and 7075-T6 aluminium alloys tested in air and vacuum [NLR-TR-74094-U] N75-29253
Evaluation of Ni-Cd cell covers. Results of testing of covers with protected brazing fillet [NLR-TR-75033-C] N75-29452
The thickness effect in plane stress fracture toughness [NLR-TR-74032-U] N75-29487
Flight-Simulation tests on notched elements [NLR-TR-74033-U] N75-29488
The incremental solution of some basic problems in elastic stability [NLR-TR-74005-U] N75-29490
NATIONAL AEROSPACE LAB., TOKYO (JAPAN).
Effects of Reynolds number and roughness on C sub L max [NAL-TR-396] N75-29026
Measurement and analysis of unsteady aerodynamic force for the vertical gust on an airplane model in the NAL gust wind tunnel [NAL-TR-399] N75-29027
Shear and moment response of the airplane wing to nonstationary turbulence [NAL-TR-404T] N75-29032
Investigation of the flows flowing from swirlers, I [NAL-TR-376] N75-29105
Digital fuel controller for lift jet engine [NAL-TR-389] N75-29122
Experimental investigation of beams exhausted from a 5cm mercury electronbombardment ion engine [NAL-TR-398] N75-29176
A numerical simulation for the spiral raising to the 24 hour orbit by a low-thrust space vehicle with Solar Electric Propulsion (SEP) system [NAL-TR-395] N75-29177
Thrust vector control by secondary injection into rocket nozzles [NAL-TR-409] N75-29178
Propagation of the flame within a narrow tube [NAL-TR-394] N75-29212
On turbulent diffusion in coaxial jets of dissimilar gases with pressure gradient [NAL-TR-392T] N75-29350
Three-dimensional flow field due to a radial vortex and source line spanning an annulus [NAL-TR-378T] N75-29354
Three-dimensional inviscid effects in axial flow turbomachinery and limitation of cascade theory [NAL-TR-379T] N75-29355

Optimum configuration of truss structures
[NAL-TR-388T] N75-29471
Response analysis of a clamped plate to boundary layer pressure fluctuations
[NAL-TR-401] N75-29475
Strength of axial flow compressor blade roots. Photoelastic stress analysis of the pin joint lug
[NAL-TR-403] N75-29476
Comparative study of counting methods by digital simulation
[NAL-TR-408] N75-29789
Simulation of digital systems consisting of elements with propagation delay time
[NAL-TR-391] N75-29792

NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER, ATLANTIC CITY, N.J.
Evaluation of a very low frequency navigation system
[AD-A005043] N75-29074
Preliminary two-dimensional area navigation terminal simulation
[AD-A006263] N75-29076
Tests with coaxial TACAN antenna at Doppler very high frequency omnirange [VOR]
[AD-A010008] N75-29080
Data link short-message cockpit display test
[AD-A005988] N75-29285
Test and evaluation of a remote control and radiofrequency repeater system for televised radar display applications
[AD-786273] N75-29286
Power interrupt equipment
[AD-A010009] N75-29319

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.
Generation of standard EM fields for calibration of power density meters 20 kHz to 1000 MHz
[COM-75-10395/2] N75-29404

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Semiconductor measurement technology
[AD-A005669] N75-29329
Natural hazards evaluation of existing buildings
[COM-75-10473/7] N75-29492

NATIONAL CENTRE OF TRIBOLOGY, RISLEY [ENGLAND].
Thermal vacuum acceptance test of no. 2 Hawker Siddeley dynamics low speed mechanism
[ESRO-ESTL-10] N75-29095
Thermal vacuum qualification test of no. 1 Marconi Space and Defence Systems low speed mechanisms
[ESRO-ESTL-11] N75-29451

NATIONAL CLIMATIC CENTER, ASHEVILLE, N.C.
Summary of synoptic meteorological observations for Great Lakes areas. Volume 2: Lake Huron and Georgian Bay
[COM-75-10364/8] N75-29694
Summary of synoptic meteorological observations for Great Lakes areas. Volume 3: Lake Michigan
[COM-75-10365/5] N75-29695
Summary of synoptic meteorological observations for Great Lakes areas. Volume 4: Lake Superior
[COM-75-10366/3] N75-29696

NATIONAL ENVIRONMENTAL RESEARCH CENTER, CINCINNATI, OHIO.
Interfacing a 24-point analog recorder to a computer controlled telemetry line
[PB-241086/8] N75-29403

NATIONAL ENVIRONMENTAL RESEARCH CENTER, RESEARCH TRIANGLE PARK, N.C.
A spectroscopic study of California smog
[PB-241022/3] N75-29594

NATIONAL ENVIRONMENTAL SATELLITE SERVICE, WASHINGTON, D.C.
An intercomparison of radiosonde and satellite-derived cross sections during the AMTEX
[COM-75-10439/8] N75-29616
A comparison of infrared imagery and video pictures in the estimation of daily rainfall from satellite data
[COM-75-10435/6] N75-29698

NATIONAL GAS TURBINE ESTABLISHMENT, PYESTOCK [ENGLAND].
Thrust/drag analysis for a front fan nacelle having two separate co-axial exhaust streams
[ARC-CP-1311] N75-29049
Deformation and failure under multiaxial stresses: A survey of laboratory techniques and experimental data
[ARC-CP-1306] N75-29484

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Preliminary results of acoustic echo sounding of the marine boundary layer during GATE
N75-29665
Ocean currents observed by NOAA ship Oceanographer during GATE
N75-29677
Spatial and temporal variations of the turbulent fluxes of heat, momentum, and water vapor over Lake Ontario during IFYCL
[COM-75-10481/0] N75-29700

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, MIAMI, FLA.
Preliminary analysis of ocean internal wave observations by acoustic soundings
N75-29684

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.
Federal plan for environmental data buoys
[COM-75-10511/4] N75-29699

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D.C.
Report to the Congress on ocean pollution, overfishing, and offshore development; July 1973 through June 1974
[COM-75-10509/8] N75-29593

NATIONAL PHYSICAL LAB., TEDDINGTON [ENGLAND].
A study of bifurcated routing in a data network and the effect of isarithmic flow control in this context
[NPL-COM-72] N75-29305
Some preliminary experiments in the use of a programmable videotape recorder as an automated history-taking device in a chest clinic
[NPL-COM-73] N75-29745
PANGLOSS: A system for reading and checking files
[NPL-NAC-59] N75-29794

NAVAL AEROSPACE MEDICAL RESEARCH LAB., PENSACOLA, FLA.
The effect of extremely low frequency radiation on human performance: A preliminary study
[AD-A005898] N75-29756

NAVAL ORDNANCE LAB., WHITE OAK, MD.
Relaxation behind strong shock waves
[AD-A005765] N75-29373

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Induced currents on two dimensional electromagnetic planar structures
[AD-A005733] N75-29339
An evaluation of magnetic mounting of accelerometers
[AD-A005735] N75-29396
An application of holographic interferometry to gun barrel erosion
[AD-A005867] N75-29400
A heterodyne detection FM-CW laser radar using a 10 micrometers source
[AD-A005865] N75-29419
A statistical verification of a ten year time series of computed surface wind conditions over the North Pacific and North Atlantic Oceans
[AD-A005869] N75-29704
V-positivity, poverses and an economic global unicity theorem of Gale and Nikaido
[AD-A005901] N75-29802
An estimator for an anti-aircraft gun fire control system
[AD-A005763] N75-29858
Study of infrared solid state images using charge transport devices
[AD-A005736] N75-29925
Technical progress and industrial development in a developing economy
[AD-A005734] N75-29951

NAVAL RESEARCH LAB., WASHINGTON, D.C.
Evaluation of algorithms for linear array beamforming on the AN/UYK-17 [XB-1] [V] signal processing element
[AD-A006251] N75-29315
A scan converter radar display system
[AD-A005881] N75-29316
Radiation transport in axisymmetric geometries
[AD-A006252] N75-29422
Mathematical analysis of current distribution in corrosion cells with circular geometry
[AD-A006553] N75-29556
A program to plot bathymetric and magnetic anomaly profiles
[AD-A006253] N75-29716
Calculations of X-ray Breusstrahlung spectra and scintillator detector yields for relativistic electron energies from 10 keV to 10 MeV
[AD-A006552] N75-29902

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
Finite element fracture mechanics analysis of two-dimensional and axisymmetric elastic and elastic-plastic cracked structures
[AD-A005880] N75-29261
Calculation of non-lifting potential flow about arbitrary three dimensional bodies based on doublet distributions
[AD-A005877] N75-29377
Analysis of plastic models of ship structures using holograph and strain gages
[AD-A006269] N75-29399
Design of a 9 inch cycloidal propeller model unit and some experimental results
[AD-A005768] N75-29442
ASR-ORTOLAN seakeeping trials [as build configuration]
[AD-A006249] N75-29711

NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.
The Monte Carlo method of evaluating integrals
[AD-A005891] N75-29837

NEVADA UNIV., RENO.
Finite element solutions for the equations of ground-water flow
[PB-240813/6] N75-29542

NEW MEXICO STATE UNIV., LAS CRUCES.
Interpretation of surface features of Europa obtained from occultations by Io
[NASA-CR-143273] N75-29958

NEW MEXICO STATE UNIV., UNIVERSITY PARK.
A review of recent models of attention
[AD-A006155] N75-29769
Control techniques for production processes using Bayesian estimation and exponential smoothing
[PB-241142/9] N75-29810

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.
Extension of the method for predicting six-degree-of-freedom store separation trajectories at speeds up to the critical speed to include a fuselage with noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A005822] N75-29071

NORTH AMERICAN ROCKWELL CORP., LOS ANGELES, CALIF.
Theoretical prediction of airplane stability derivatives at subcritical speeds
[NASA-CR-132681] N75-29089

NORTH CAROLINA UNIV., CHAPEL HILL.
Legal aspects of phosphate mining in North Carolina
[COM-75-10504/9] N75-29540
Some contributions to multivariate nonparametric methods
[AD-A006154] N75-29832

NORTHERN PRAIRIE WILDLIFE RESEARCH CENTER, JAMESTOWN, N. DAK.
Utilization of Skylab [EREP] system for appraising changes in continental migratory bird habitat
[E75-10361] N75-29503

NORTHROP SERVICES, INC., HUNTSVILLE, ALA.
Mission roles for the solar electric propulsion stage with the space transportation system
[NASA-CR-120664] N75-29170

NOTRE DAME UNIV., IND.
Nuclear structure research
N75-29875
Experiments
N75-29876
Stripping to unbound states
N75-29877
Spectroscopy in the sd and fp shells
N75-29878
Energy measurements
N75-29879
Spectroscopy in the rare earth region
N75-29880

NUCLEAR REGULATORY COMMISSION, WASHINGTON, D.C.
Construction of Philadelphia Electric Company's Fulton generating station, units 1 and 2. Dockets nos. 50-463 and 50-464
[PB-241165/0] N75-29551
Safety evaluation of the Washington public power supply system, nuclear projects 1 and 4. Dockets 50-460 and 50-513
[PB-241266/6] N75-29882
Safety evaluation report of Joseph M. Farely nuclear plant, units 1 and 2
[PB-241108/0] N75-29883
Safety evaluation of the energy research and development administration's loss of fluid test facility. Project no. 394
[PB-241456/3] N75-29884
Environmental survey of transportation of radioactive materials to and from nuclear power plants, supplement 1
[PB-241065/2] N75-29956

O

OAK RIDGE ASSOCIATED UNIVERSITIES, TENN.
TAT welding technology training program
[PB-241047/0] N75-29447

OBSERVATORIO DEL EBRO, TORTOSA [SPAIN].
Some results of electron content measurements at Tortosa from the Intelsat 2-F3 transmissions
[AD-A006202] N75-29610

OFFICE OF NAVAL RESEARCH, LONDON [ENGLAND].
Molecular dynamics calculators at Orsay
[AD-A006027] N75-29924

OHIO DEPT. OF ECONOMIC AND COMMUNITY DEVELOPMENT, COLUMBUS.
Ohio Skylab EREP investigation
[E75-10365] N75-29507
Ohio Skylab EREP investigation
[E75-10373] N75-29515

OHIO STATE UNIV., COLUMBUS.
ATS-6 millimeter wavelength propagation experiment
[NASA-CR-143832] N75-29290
Man-pack loop antenna system
[AD-A006278] N75-29326
Some simple methods for the unique assignment of a density distribution to a harmonic function
[AD-A006026] N75-29615
A FORTRAN 4 program for the determination of the anomalous potential using stepwise least squares collocation
[AD-A006362] N75-29618
Mean gravity anomaly prediction from terrestrial gravity data and satellite altimeter data
[AD-A006363] N75-29619
A model for data secure systems, part 2
[AD-A006276] N75-29803
ATS-6 millimeter wavelength propagation experiment
[NASA-CR-143829] N75-29944
Adjustment of mean earth ellipsoid parameters
[AD-A006364] N75-29972
OHIO UNIV., ATHENS.
Parameter optimization of vibration absorbers and shock isolators by root-locus technique
N75-29276
OLD DOMINION SYSTEMS, INC., GAITHERSBURG, MD.
CO2 laser ranging systems study
[NASA-CR-144655] N75-29410
OLD DOMINION UNIV. RESEARCH FOUNDATION, NORFOLK, VA.
Computer simulation of plasma and N-body problems
[NASA-CR-143286] N75-29894
OPERATIONS RESEARCH, INC., SILVER SPRING, MD.
Engineering studies in support of the implementation plan for the distress alerting and locating system DALS, volume 1
[AD-A005273] N75-29082
OREGON STATE UNIV., CORVALLIS.
Anomalous variations in temperature-salinity relationships at GATE station 7
N75-29680
OWENS VALLEY RADIO OBSERVATORY, PASADENA, CALIF.
Observations with a VLB array. The sources 3C120, 3C273, 2134 and 004, and 3C84, 3
[AD-A005769] N75-29967
OWENS-CORNING FIBERGLAS CORP., TOLEDO, OHIO.
Research, development and application of noncombustible Beta fiber structures
[NASA-CR-144365] N75-29186
OXFORD UNIV. [ENGLAND].
Bubble nucleation at real surfaces with no pre-existing gaseous phase
[OUEL-1110/74] N75-29279
Film cooling effectiveness from rows of holes under simulated gas turbine conditions
[ARC-CP-1303] N75-29367
Inter-particle percolation. Part 1: Demonstration of the phenomenon and equipment development
[OUEL-1102/74-PT-1] N75-29864
Inter-particle percolation. Part 2: Results and discussion
[OUEL-1103/74-PT-2] N75-29865

P

PAINE COLL., AUGUSTA, GA.
The study of single crystals for space processing and the effect of zero gravity
[NASA-CR-143271] N75-29914
PAYNE, INC., ANNAPOLIS, MD.
Some studies relating to limb flailing after an emergency escape from an aircraft
[AD-A005699] N75-29752
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Unsteady vortex lattice techniques applied to wake formation and performance of the statically thrusting propeller
[NASA-CR-132686] N75-29031
Processing ERTS and Aircraft MSS data with the General Electric Image 100 system
[E75-10362] N75-29504
Satellite detection of vegetative damage and alteration caused by pollutants emitted by a zinc smelter
[E75-10368] N75-29510
A feasibility study of a microwave water vapor measurement from a space probe along an occultation path
[NASA-CR-143266] N75-29603
Effects of hypnotic drugs on performance before and after sleep
[NASA-CR-143311] N75-29743
PENNSYLVANIA UNIV., PHILADELPHIA.
Space shuttle electromagnetic environment experiment. Phase A: Definition study
[NASA-CR-143834] N75-29162
Limitation on the use of the horizontal clinostat as a gravity compensator
[NASA-CR-143288] N75-29386
Detection of crop mark contrast for archaeological surveys
[E75-10364] N75-29506
PHYSICAL ELECTRONICS LABS., MENLO PARK, CALIF.
Broadband ferrite limiters
[AD-A005279] N75-29328
PHYSICS LAB. RVO-TNO, THE HAGUE [NETHERLANDS].
Efficiency of a phased array antenna as a function of phase shifter loss and mismatch due to mutual coupling
[PHL-1974-31] N75-29321
A wide-angle scan matching technique for an infinite plane phased array antenna
[PHL-1974-33] N75-29322
Comparison of some classes of MTI filters for a 3-pulse canceller with staggered PRF
[PHL-1974-38] N75-29323
The estimation of the direction of radar targets
[PHL-1975-01] N75-29324
Visibility on the Atlantic Ocean and the North Sea
[PHL-1974-32] N75-29688
PITTSBURGH UNIV., PA.
Studies related to the surfaces of the moon and planets
[NASA-CR-143268] N75-29937
POLYTECHNIC INST. OF NEW YORK, BROOKLYN.
Approximation of complex aerospace systems by simpler ones
[AD-A006466] N75-29859
PORTLAND GENERAL ELECTRIC CO., OREG.
Ecological characteristics of the Boardman Site and environs, Morrow County, Oregon
[PB-241071/0] N75-29502
PRATT AND WHITNEY AIRCRAFT, WEST PALM BEACH, FLA.
Development of sputtered techniques for thrust chambers
[NASA-CR-134824] N75-29248
PRC INFORMATION SCIENCES CO., MCLEAN, VA.
ACS batch processing system. Volume 1: System design document
[AD-A005304] N75-29537
ACS batch processing system. Volume 2: User's guide
[AD-A005305] N75-29538
ACS batch processing system. Volume 3: System and functional program description
[AD-A005306] N75-29539
PRINCETON UNIV., N.J.
Some developing concepts of engineering education
N75-29003
Simulation model for New York air traffic control communications
[AD-A006425] N75-29083
The gas density balance and the mass chromatograph
[AD-A006481] N75-29226
Polydichlorophosphazene: Thermomechanical behavior
[AD-A005911] N75-29265
Polyphosphazenes: Thermomechanical transitions
[AD-A006328] N75-29919
PURDUE UNIV., LAFAYETTE, IND.
Reliable line signaling techniques for the FAA GRN-27[V] and CAT-3 ILS
[AD-A009881] N75-29077
Turbulent mixing in non-reactive and reactive flows
[AD-A006322] N75-29376
Study of the utilization of EREP data from the Wabash River Basin
[E75-10377] N75-29519
The application of remote sensing technology to the solution of problems in the management of resources in Indiana
[NASA-CR-143317] N75-29527
The decision tree approach to classification
[NASA-CR-141930] N75-29528
Bringing remote sensing technology to the user community
[NASA-CR-141931] N75-29529
Interpolation of ERTS-1 multispectral scanner data
[NASA-CR-141861] N75-29530
The effects of the physical and chemical properties of soils on the spectral reflectance of soils
[NASA-CR-144379] N75-29534
Crop identification technology assessment for remote sensing [CITARS]. Volume 6: Data processing at the laboratory for applications of remote sensing
[NASA-CR-144374] N75-29536
Syllable detection in continuous speech
[AD-A005718] N75-29812

R

RADIO CORP. OF AMERICA, BURLINGTON, MASS.
Manufacturing methods and technology program Automated Image Device Evaluator [AIDE]
[AD-A006546] N75-29338
RADIO CORP. OF AMERICA, CAPE KENNEDY, FLA.
Ship to shore Oregon test series 2
[AD-A006043] N75-29058
Balloon armament test [test plan]
[AD-A006045] N75-29059
Program description. The ARPA/RML atmospheric sciences program
[AD-A006044] N75-29060
Procedure for testing synthetic fiber cables for flexing fatigue under load
[AD-A006042] N75-29189
RENSSELAER POLYTECHNIC INST., TROY, N.Y.
Problems of the gamma ray laser
[AD-A006197] N75-29424
RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM [SWEDEN].
Synthesis of N-acetylneuraminic acid derivatives and studies of their interaction with vibrio cholerae neuraminidase
[FOA-B-40018-B6] N75-29182
An investigation of electromagnetic wave scattering from rough surfaces, based on a comparison between vectorial and scalar Kirchhoff methods
[FOA-B-20002-E1] N75-29862
On the determination of the photo-ionization energy and the concentration of defects created by nuclear radiation in silicon diodes
[FOA-B-30003-A3] N75-29913
REYNOLDS, SMITH AND HILLS, JACKSONVILLE, FLA.
Energy conservation study of Veterans Administration hospitals. Stage 1: Base line survey
[PB-241095/9] N75-29559
Energy conservation study of Veterans Administration hospitals. Stage 2: Operational study
[PB-241096/7] N75-29560
Energy conservation study of Veterans Administration hospitals. Stage 3: Hospital energy control system
[PB-241097/5] N75-29561
Energy conservation study of Veterans Administration hospitals. Stage 4: Basic detail data for stage 1, 2, and 3
[PB-241098/3] N75-29562
RHODE ISLAND UNIV., KINGSTON.
A bibliography of numerical models for tidal rivers, estuaries and coastal waters
[COM-75-10477/8] N75-29712
RICE UNIV., HOUSTON, TEX.
A hybrid approach to optimal control problems with bounded state. Part 1: Theory
[AD-A006191] N75-29815
Optimal linear and nonlinear feature extraction based on the minimization of the increased risk of misclassification
[NASA-CR-144385] N75-29821
Magnetic merging in a collisionless plasma
[AD-A006408] N75-29905
ROCKETDYNE, CANOGA PARK, CALIF.
Material evaluation program, high-temperature nitriding environment
[NASA-CR-144382] N75-29216
Method of heat treating age-hardenable alloys
[NASA-CASE-XNP-01311] N75-29236
Thrust measurement
[NASA-CASE-XMS-05731] N75-29382
ROCKWELL INTERNATIONAL CORP., CANOGA PARK, CALIF.
Fine orifice injector development
[AD-A006204] N75-29418
ROCKWELL INTERNATIONAL SCIENCE CENTER, THOUSAND OAKS, CALIF.
D-band surface states on wide band gap insulators. A conceptual model for surface states and catalysis on D-band perovskites
[AD-A005783] N75-29933
Study of grain boundary segregation relating to intergranular fracture
[AD-A006422] N75-29934
ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.
FAA lightning protection study: Lightning protection requirements for the ARTS 3 system
[AD-A009662] N75-29131
FAA lightning protection study: Lightning protection requirements for AIL Mark 1 instrument landing system
[AD-A009342] N75-29133
FAA lightning protection study: Lightning protection requirements for Wilcox Mark I/C instrument landing system
[AD-A009010] N75-29136
ROSENSTIEL SCHOOL OF MARINE AND ATMOSPHERIC SCIENCES, MIAMI, FLA.
Single-wing current meter housing
[AD-A006281] N75-29398
Fluctuations in the vertical structure of the Atlantic equatorial undercurrent
N75-29675
Hydrostatic pressure equilibrated tensiometer
[AD-A006282] N75-29710
Improved seagoing scale
[AD-A006321] N75-29713
Silicon-32 fiber sampler
[AD-A006275] N75-29714

In-situ separator
[AD-A006274] N75-29734

ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH [ENGLAND].
Some unseparated base flows with heat addition
[ARC-R/M-3756] N75-29041
The dynamic stability derivatives of a slender wing at zero and moderate life. A comparison of theory with free-flight model tests, Mach number equals 0.8 to 2.0
[ARC-CP-1310] N75-29048
A finite-difference scheme for computing supercritical flows in arbitrary co-ordinate systems
[ARC-CP-1313] N75-29050
Free-flight model dynamic stability measurements on a not-so-slender wing/fin combination at zero and small lift, Mach number equals 0.8 to 2.0
[ARC-CP-1315] N75-29051
Second-order small-perturbation theory for finite wings in incompressible flow
[ARC-R/M-3759] N75-29052
A technique for analysing the results of a flutter calculation
[ARC-R/M-3765] N75-29054
Longitudinal motions of aircraft involving high angles of attack
[ARC-R/M-3753] N75-29094
The Skynet 2 attitude sensor prediction and events program WINK 2
[RAE-TR-74091] N75-29147
Analysis of the orbit of Ariel 1, 1962-15A, near 15th-order resonance
[RAE-TR-74107] N75-29148
Orbital requirements for the Astronomical Roentgen Observatory Satellite
[RAE-TR-74110] N75-29149
The evolution of the PROP6 orbit determination program and related topics
[RAE-TR-74164] N75-29150
Mathematical modelling of the RAE lightweight flexible solar array
[RAE-TR-74112] N75-29157
Determining the trajectories of multiple objects using stereophotography and photogrammetry
[RAE-TM-IR-148] N75-29391
Tests on probes designed to measure stagnation pressure directly in a supersonic stream
[ARC-R/M-3755] N75-29392
A short study of the effect of a penetrant oil on the fatigue life of a riveted joint
[ARC-CP-1305] N75-29483
Fatigue crack propagation in thin sheets of L73 under constant strain amplitude
[ARC-CP-1314] N75-29485
Head and neck mobility of pilots measured at the eye
[RAE-TR-74158] N75-29781
Statistics in human engineering
[RAE-TR-74166] N75-29782

ROYAL AIRCRAFT ESTABLISHMENT, TEDDINGTON [ENGLAND].
The prediction of boundary-layer behavior and profile drag for infinite yawed wings. Part 2: Flow near a turbulent attachment line
[ARC-CP-1308] N75-29043
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 1: A method of calculation
[ARC-CP-1307-PT-1] N75-29046
The prediction of boundary-layer behaviour and profile drag for infinite yawed wings. Part 3: Calculations for a particular wing
[ARC-CP-1309-PT-3] N75-29047

ROYAL INST. OF TECH., STOCKHOLM [SWEDEN].
A mechanism for driving the gross Birkeland current configuration in the auroral oval
[TRITA-EPP-74-25] N75-29607
An external ring system for magnetic plasma confinement
[TRITA-EPP-74-08] N75-29897
Experiments on magnetoacoustic resonances in a rotating plasma
[TRITA-EPP-74-24] N75-29898
Stabilization of kink disturbances by inhomogeneous magnetic fields
[TRITA-EPP-75-01] N75-29899

ROYAL NORWEGIAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, KJELLER.
NORSAR phase 3
[AD-A005775] N75-29623

ROYAL RADAR ESTABLISHMENT, MALVERN [ENGLAND].
A review of clutter, 1974
[RRE-TN-783] N75-29300

RUTGERS UNIV., NEW BRUNSWICK, N.J.
Biodegradation of some polynuclear aromatic petroleum components by marine bacteria
[AD-A006346] N75-29733

S

SAAD PUBLICATIONS, KARACHI [PAKISTAN].
Study of outer space by reaction devices
[NASA-TT-F-15571] N75-29141
Mastery of outer space in the USSR, 1957 - 1967
[NASA-TT-F-16516] N75-29144
A course in practical astrophysics
[NASA-TT-F-15570] N75-29970

SAINT LAWRENCE UNIV., CANTON, N.Y.
Investigation of relationships between linears, tonal and hazy anomalies, and petroleum production in the Williston Basin: An ERTS approach
[E75-10370] N75-29512
Investigation of relationships between linears, total and hazy areas, and petroleum production in the Williston Basin: An ERTS approach
[E75-10384] N75-29526

SALFORD UNIV. [ENGLAND].
A form of the supersonic flow equations for an ideal gas
[ARC-R/M-3757] N75-29042

SANDIA CORP., ALBUQUERQUE, N.MEX.
Surface cleaning in thin film technology
[SAND-74-0344] N75-29183

SANTA CLARA UNIV., CALIF.
Large-scale systems: Complexity, stability, reliability
N75-29852

SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.
Removing trace contaminants from sampling cylinders
[AD-A006138] N75-29397
The plus Gz protective methods for use in advanced fighter-attack aircraft
N75-29727
The aircrewman at increased risk of ischemic vascular disease
N75-29728
Evaluation of an acoustical X-Y digitizer for use in biomedical data reduction tasks
[AD-A005293] N75-29746
Litter enplaning-deplaning device
[AD-A006137] N75-29754
Measured effects of square wave modulated RF fields [450 and 3100 MHz] on cardiac pacemakers
[AD-A006389] N75-29755

SCHOOL OF APPLIED AEROSPACE SCIENCES, SHEPPARD AFB, TEX.
Training of enlisted women as jet aircraft maintenance specialists
[AD-A006434] N75-29771

SCIENCE APPLICATIONS, INC., ANN ARBOR, MICH.
Investigation of DF laser propagation
[AD-A005631] N75-29608

SCIENCE APPLICATIONS, INC., HUNTSVILLE, ALA.
Monte Carlo variance reduction study
[NASA-CR-120672] N75-29818

SCIENTIFIC TRANSLATION SERVICE, SANTA BARBARA, CALIF.
Calculation of aircraft engine turbines. [Gasdynamic calculation: Blade profiling]
[NASA-TT-F-16367] N75-29120
Flight control and the effectiveness of an aviation system
[NASA-TT-F-16262] N75-29126
Theoretical aspects of the fundamental velocity of flames in the turbulent regime
[NASA-TT-F-16511] N75-29215
Effect of oxygen impurity on the pressure-sintering of aluminum nitride
[NASA-TT-F-16452] N75-29237
Reaction between refractory metals and insulating nitrides at high temperatures
[NASA-TT-F-16477] N75-29239
Balloon sounding of the atmosphere
[NASA-TT-F-16380] N75-29635
Space food preparation and packaging. A menu for cosmonauts and 'space' bread
[NASA-TT-F-16467] N75-29720
The prophylactic effect of headcooling on coal miner's cramps. 1: Electroencephalographic observation on rabbits during head-cooling under the hot and humid environment
[NASA-TT-F-16448] N75-29739
On the otoliths and their origin
[NASA-TT-F-16470] N75-29741
Studies on the otoliths of the teleosts
[NASA-TT-F-16471] N75-29742
Plasma on earth and in space
[NASA-TT-F-16373] N75-29895
Transformation in the atmosphere of solar radiation reflected from the ocean
[NASA-TT-F-16487] N75-29979
Spectral structure of the field of solar radiation reflected by the ocean-atmosphere system
[NASA-TT-F-16488] N75-29980

SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.
Marine physics: Internal-surface wave interaction and microstructure measurement program
[AD-A005828] N75-29707
Ship drift components: Means and standard deviations
[AD-A006470] N75-29708

SHEFFIELD UNIV. [ENGLAND].
Predictive distributions in life tests under competing causes of failure
[RR-166/GAB/IRD/1] N75-29450
Mixtures of invariant non-ergodic probabilities
[RR-162/MBR/1] N75-29840
The asymptotic behaviour of the Hurst range
[RR-164/PSC/3] N75-29841
Some remarks on the construction of independent identically distributed random variables and Markov chains
[RR-160/DNS/MBR/2] N75-29842
Limit theorems for the [A,B] process
[RR-168/PSC/4] N75-29843

SHOCK AND VIBRATION INFORMATION CENTER [DEFENSE], WASHINGTON, D.C.
The Shock and Vibration Digest, Volume 7, No. 5, May 1975
[AD-A010036/2] N75-29272
The Shock and Vibration Digest, Volume 7, No. 2, February 1975
[AD-A006665/4] N75-29465

SIGNALS RESEARCH AND DEVELOPMENT ESTABLISHMENT, CHRISTCHURCH [ENGLAND].
GOSPRE: A simple analytical program for computing grade of service in a heavily loaded communications network
[SRDE-74018] N75-29301

SILICON TRANSISTOR CORP., CHELMSFORD, MASS.
Production engineering measure for high current, fast switching transistors
[AD-A005666] N75-29327

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS.
Station coordinates in the standard earth 3 system and radiation-pressure perturbations from ISAGEX camera data
[NASA-CR-143315] N75-29535

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, CANNES [FRANCE].
Vibration damping of satellite structures
[REPT-251-CA/53] N75-29167
Vibration damping of satellite structures. Report on tests
[REPT-828-CA/40] N75-29168

SOFTECH, INC., WALTHAM, MASS.
A TUTOR minicomputer system
[AD-A005782] N75-29790

SOLAR, SAN DIEGO, CALIF.
High temperature sensors for Army gas turbine engines
[AD-A005166] N75-29123
Solar 10 kW turboalternator silent power program
[AD-A006549] N75-29555

SOUTH CAROLINA UNIV., COLUMBIA.
Characterization of silicon carbide
[AD-A006409] N75-29932

SOUTHAMPTON UNIV. [ENGLAND].
A thin film catalytic-non-catalytic heat transfer gauge for shock tube measurements in reacting gases
[AASU-336] N75-29390
Activities of the Institute of Sound and Vibration Research
N75-29995

SOUTHEASTERN MASSACHUSETTS UNIV., NORTH DARTMOUTH.
Comparison of orthogonal transforms for teleseismic data
[AD-A006232] N75-29609

SOUTHERN METHODIST UNIV., DALLAS, TEX.
Identification of earthquakes and underground explosions
[AD-A006467] N75-29621

SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
A simulation study of active feedback supression of dynamic response in helicopter rotor blades
[NASA-CR-132711] N75-29127
Performance of Army engines with leaded and unleaded gasoline. Phase 2: Field study evaluation
[AD-A005577] N75-29440
Fatigue damage equivalence of field and simulated vibrational environments
[AD-A006226] N75-29453
Research on biological effects of VLF band electromagnetic radiation
[AD-A006388] N75-29753

STANDARD OIL CO., CLEVELAND, OHIO.
Production and engineering methods for Carb-Tek [trade name] batteries in fork lift trucks
[AD-A006548] N75-29554

STANFORD UNIV., CALIF.
The predicament of aeronautical engineering education and what we can do about it
N75-29005
University research in aeronautics
N75-29022
A study of energetic particle precipitation effects associated with discrete VLF signals, and of the mechanism of VLF emission generation
[AD-A006464] N75-29620
A hypothetical dialogue exhibiting a knowledge base for a program understanding system
[AD-A006294] N75-29799

Computer generation of natural language from a deep conceptual base
[AD-A005041] N75-29809
Computational understanding: Analysis of sentences and context
[AD-A005040] N75-29811
Pulsar extinction
[NASA-CR-143272] N75-29969
STATE UNIV. OF NEW YORK, ALBANY.
Image processing and data reduction of Apollo low light level photographs
[NASA-CR-144659] N75-29389
STATE UNIV. OF NEW YORK, STONY BROOK.
Thermodynamics and kinetics of reactions in protective coating systems
[NASA-CR-143313] N75-29249
STEVENS INST. OF TECH., HOBOKEN, N.J.
An investigation of the SNS Josephson junction as a three-terminal device
[NASA-CR-143254] N75-29907
STOCKHOLM UNIV. [SWEDEN].
Calculations of the mean regional dispersion of a radioactive gas emitted from a continuous source
[AC-29] N75-29685
Vertical structure of hemispheric temperature spectral components
[DM-13] N75-29686
The spectral balance equation
[DM-14] N75-29687
STONE [RALPH] AND CO., INC., LOS ANGELES, CALIF.
The effects of air and water pollution controls on solid waste generation, 1971 - 1985. Executive summary
[PB-240739/2] N75-29600
STUTTGART UNIV. [WEST GERMANY].
Fatigue strength of the titanium alloys Ti 8Al 1Mo 1V, Ti 5Al 2.5Sn and Ti 6Al 4V at high temperatures
[ISD-161] N75-29251
ESTOQ: A program for calculation of primary shock sources for avoidance of ray-effects with two dimensional S sub N calculations
[REPT-4-17] N75-29363
An incore finite element program for research and teaching purposes
[ISD-162] N75-29486
SUMMA CORP., CULVER CITY, CALIF.
Failsafe/safe-life interface criteria
[AD-A006131] N75-29462
SYSTEM DEVELOPMENT CORP., SANTA MONICA, CALIF.
A phonological rules system
[AD-A005826] N75-29813
SYSTEM INNOVATION AND DEVELOPMENT CORP., ROLLING HILLS ESTATES, CALIF.
Automatic external load aquisition by helicopter
[AD-A005051] N75-29097
SYSTEMS CONSULTANTS, INC., FALLS CHURCH, VA.
Study to develop regional and nation-wide estimates of General Aviation [GA] activity at non-towered airports
[AD-A009883] N75-29062

T

TECHNION - ISRAEL INST. OF TECH., HAIFA.
Failure modes of angle ply laminates
[AD-A005737] N75-29493
Characterization of optimality in convex programming without a constraint qualification
[AD-A005903] N75-29800
F-convex functions
[AD-A005900] N75-29836
TECHNION, INC., IRVINE, CALIF.
Mechanisms of magnetoplasmadynamic arc jet acceleration processes
[AD-A006234] N75-29903
TECHNISCHE HOGESCHOOL, DELFT [NETHERLANDS].
The computation of aerodynamic loads on helicopter blades in forward flight, using the method of the acceleration potential
[VTH-189] N75-29055
Numerical calculation of two classes of potential problems, illustrated with the flow from a channel against a wedge
[WTHD-71] N75-29366
Conical stagnation points in the supersonic flow around slender circular cones at incidence
[VTH-184] N75-29368
Numerical integration of the momentum-integral equations and application of the results to the flow between rotating disks
[VTH-183] N75-29369
Measurements at the leeward side of a cone at large incidences in supersonic flow
[VTH-186] N75-29370
On the complementary energy theorem in nonlinear elasticity theory
[WTHD-72] N75-29478
Mode interaction with stiffened panels
[VTH-180] N75-29489
TECHNOLOGICAL LAB. RVO-TNO, RIJSWIJK [NETHERLANDS].
Improvement of the acceptance and surveillance control of nitrate ester propellants. Part 3: Comparative investigation of stability tests for nitrate ester propellants
[TL-1974-20-PT-3] N75-29267
TECHNOLOGY SERVICE CORP., SANTA MONICA, CALIF.
Adaptive angle tracking
[AD-A006279] N75-29306
TEL-AVIV UNIV. [ISRAEL].
Failure modes of angle ply laminates
[AD-A005737] N75-29493
TELEDYNE BROWN ENGINEERING, HUNTSVILLE, ALA.
Calculations for interpretation of solar vector magnetograph data
[NASA-CR-120685] N75-29986
TELEDYNE GEOTECHNICAL, GARLAND, TEX.
Project T/3703
[AD-A006437] N75-29613
TENNESSEE UNIV., KNOXVILLE.
Noise suppression with high Mach number inlets
[NASA-CR-143314] N75-29115
Design phase of an environmental technology utilization pilot project through the agricultural extension service in Tennessee
[PB-240761/7] N75-29588
TERRA TEK, INC., SALT LAKE CITY, UTAH.
Characterization of 2014-T651 aluminum alloy
[AD-A006260] N75-29259
TEXAS A&M UNIV., COLLEGE STATION.
Multiple scattered radiation emerging from continental haze layers. 1: Radiance, polarization, and neutral points
[NASA-CR-143269] N75-29605
Multiple scattered radiation emerging from continental haze layers. 2: Ellipticity and direction of polarization
[NASA-CR-143284] N75-29985
TEXAS HIGHWAY DEPT., AUSTIN.
The behavior of an axially loaded drilled shaft under sustained loading
[PB-240328/5] N75-29495
TEXAS INSTRUMENTS, INC., DALLAS.
Source studies in the near and far field, part A
[AD-A005786] N75-29622
TEXAS UNIV., AUSTIN.
The behavior of an axially loaded drilled shaft under sustained loading
[PB-240328/5] N75-29495
Characterization of optimality in convex programming without a constraint qualification
[AD-A005903] N75-29800
Primal geometric programs treated by linear programming
[AD-A005902] N75-29801
V-positivity, poverses and an economic global unicity theorem of Gale and Nikaido
[AD-A005901] N75-29802
F-convex functions
[AD-A005900] N75-29836
Magnetic and electrical properties of novel compounds in the alkaline earth-transition metal-sulfur and selenium systems
[AD-A005723] N75-29918
Amorphous semiconductors
[AD-A005831] N75-29931
Accuracy of site coordinates obtainable by a mobile lunar laser station
[NASA-CR-143052] N75-29959
TEXAS UNIV., HOUSTON.
Study to define and verify the personal oral hygiene requirements for extended manned space flight: Oral physiology and microbiology in Skylab manned space missions
[NASA-CR-144361] N75-29740
TEXTILE RESEARCH INST., PRINCETON, N.J.
The gas density balance and the mass chromatograph
[AD-A006481] N75-29226
TOKYO UNIV. [JAPAN].
A numerical study on the effects of viscosity on the performance of CO2 gasdynamic laser
[ISAS-528-VOL-40-NO-8] N75-29408
Experimental study on preceding viscoelastic strain disturbances: An inverse problem in dynamic fracture
[ISAS-529-VOL-40-NO-9] N75-29477
The electron energy loss rates by polar molecules
[ISAS-530-VOL-40-NO-10] N75-29871
TORONTO UNIV. [ONTARIO].
Experiments of nonequilibrium, nonstationary expansion of water vapour/carrier gas mixture in a shock tube
[UTIAS-195] N75-29863
TRANSEMANTICS, INC., WASHINGTON, D.C.
Study of the quality of autonomous and separate control of monohydrate concentration and level in sulfuric acid plants
[NASA-TT-F-16491] N75-29214
Investigation of radiometers. 4. Experimental contributions to the examination of the theories of the common single-plate radiometer
[NASA-TT-F-16480] N75-29385
Effect of sectioning of the spinal cord in the midlumbar portion on heat exchange and development of fever in rabbits
[NASA-TT-F-16496] N75-29731
Resistance of Nadsoniella nigra var. hesuelica to the action of a high vacuum
[NASA-TT-F-16503] N75-29732
TRANSPORTATION RESEARCH BOARD, WASHINGTON, D.C.
Characteristics of and factors influencing bituminous materials and mixture
[PB-240957/1] N75-29191
TRANSPORTATION SYSTEMS CENTER, CAMBRIDGE, MASS.
Advanced air traffic management system study: Technical summary
[PB-241223/7] N75-29086
Air traffic demand estimates for 1995
[PB-241083/] N75-29935
TRW SYSTEMS GROUP, HOUSTON, TEX.
The relative effects of entry parameters on thermal protection system weight
[NASA-CR-144386] N75-29166
TRW SYSTEMS GROUP, REDONDO BEACH, CALIF.
Ionospheric plasma effects
[AD-A006242] N75-29612
Development of high intensity ion sources
[AD-A005824] N75-29906
TRW, INC., CLEVELAND, OHIO.
Forged metal powder gears
[AD-A005787] N75-29441

U

UNITED AIR LINES, INC., CHICAGO, ILL.
Engineering simulation evaluation of the two-segment noise abatement approach in the Douglas DC-9-61
[NASA-CR-137665] N75-29121
UNITED AIRCRAFT CORP., WASHINGTON, D.C.
Space life support technology for a modular integrated utility system
N75-29723
URS/MATRIX CO., FALLS CHURCH, VA.
Evaluating maintenance performance test administrator's manual and text subject's instructions for criterion referenced job task performance tests for electronic maintenance
[AD-A005785] N75-29768
URWICK, CURRIE AND PARTNERS LTD., MONTREAL [QUEBEC].
Data terminal technology, present and future. Volume 1: State-of-the-art
[CRC-1276-1-VOL-1] N75-29296
Data terminal technology, present and future. Volume 2. Technology forecasting and assessment
[CRC-1276-2] N75-29297
UTAH STATE UNIV., LOGAN.
Moment method solutions for the impedance of asymmetrically driven RF probes in the collisional ionospheric magnetoplasma
[AD-A006200] N75-29611

V

VERSAR, INC., SPRINGFIELD, VA.
Assessment of industrial hazardous waste practices, storage and primary batteries industries
[PB-241204/7] N75-29592
VIRGINIA STATE COLL., PETERSBURG.
Non-linear effects of surface tension in cavity flow
[AD-A006036] N75-29375
VIRGINIA UNIV., CHARLOTTESVILLE.
On the structure and organization of clouds in the GATE area
N75-29655
Systematic variations in inshore bathymetry
[AD-A006393] N75-29709
VON KARMAN INST. FOR FLUID DYNAMICS, RHODE-SAINT-GENESE [BELGIUM].
A numerical method for the solution of the two-dimensional steady laminar boundary layer equations
[VKI-TN-103] N75-29044
Analysis of an axisymmetrical turbulent pulsating jet
[VKI-TN-104] N75-29045

W

WASHINGTON UNIV., SEATTLE.
The predicament of aeronautical engineering education and what we can do about it
N75-29006
Source identification of oil spills by pattern recognition analysis of natural elemental compositon
[AD-A006471] N75-29580
WASHINGTON UNIV., ST. LOUIS, MO.
Development of solar wind shock models with tensor plasma pressure for data analysis
[NASA-CR-143301] N75-29978

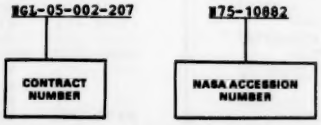
WATERVLIET ARSENAL, N.Y.
Forced extensional vibrations of plates
[AD-A006150] N75-29491
WEBB INST. OF NAVAL ARCHITECTURE, GLEN COVE, N.Y.
Fuel conservation in ship operations
[COM-75-10466/1] N75-29270
WESTERN REGIONAL RESEARCH LAB., BERKELEY, CALIF.
Source identification of oil spills by pattern recognition analysis of natural elemental composition
[AD-A006471] N75-29580
WESTINGHOUSE DEFENSE AND ELECTRONIC SYSTEMS CENTER, BALTIMORE, MD.
Breadboard linear array scan imager program
[NASA-CR-143828] N75-29887
WESTINGHOUSE RESEARCH LABS., PITTSBURGH, PA.
Superconducting windings
[AD-A006476] N75-29337
Silicon ribbon study program
[NASA-CR-134821] N75-29910
Electronic magnification for astronomical camera tubes
[NASA-CR-143827] N75-29961
WILKES GOLL., WILKES-BARRE, PA.
Removal of manganese from mine drainage by ozone and chlorine
[PB-241143/7] N75-29541
WISCONSIN UNIV., MADISON.
World climate and world food systems 1: Heyupp-skera, an heuristic model for hay yield in Iceland
[PB-240870/6] N75-29690
World climate and world food systems 3: The lessons of climatic history
[PB-240872/2] N75-29691
World climate and world food systems 4: A survey of the state of the art in meteorological long range statistical forecasting
[PB-240873/0] N75-29692
World climate and world food systems 5: The special model; history and present state of the art
[PB-240874/8] N75-29693
On remainders and the convergence of cardinal spline interpolation for almost periodic functions
[AD-A006544] N75-29825
An H sup [-1] Galerkin method for parabolic problems in a single space variable
[AD-A006541] N75-29826
Spline approximation to the solution of the linear Fredholm integral equation of the second kind
[AD-A006539] N75-29827
On the empirical Bayes approach to multiple decision problems
[AD-A006543] N75-29828
F-convex functions
[AD-A005900] N75-29836
WISCONSIN UNIV., STOUGHTON.
Operation of the synchrotron radiation center of the University of Wisconsin
[AD-A005784] N75-29885
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
Catalogue of geoidal variations for simple seafloor topographic features
[NASA-CR-141400] N75-29706
WORLD METEOROLOGICAL ORGANIZATION, GENEVA [SWITZERLAND].
WMO operations manual for sampling and analysis techniques for chemical constituents in air and precipitation. Part 1: The minimum programme at regional air-pollution stations. Part 2: Guidelines for baseline stations and regional stations with extended programmes
[WMO-299] N75-29574
Preliminary scientific results of the GARP Atlantic tropical experiment, volume 2
[GATE-14-VOL-2] N75-29639

Y

YALE UNIV. OBSERVATORY, NEW HAVEN, CONN.
Observations with a VLB array. The sources 3C120, 3C273, 2134 and 004, and 3C84, 3
[AD-A005769] N75-29967
YALE UNIV., NEW HAVEN, CONN.
Experimental studies of the collisional excitation of infrared active vibrational stretch modes in CO2 and H2O with an intersecting, hyperthermal molecular beam apparatus, volume 1
[AD-A006237] N75-29886

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. 4041
N75-29072
AF PROJ. 5720
N75-29804
AF PROJ. 627A
N75-29946
AF PROJ. 1367
N75-29102
AF PROJ. 1467
N75-29497
AF PROJ. 1710
N75-29768
AF PROJ. 1987
N75-29129
AF PROJ. 2001
N75-29416
AF PROJ. 2153
N75-29413
AF PROJ. 2801
N75-29805
AF PROJ. 3066
N75-29125
AF PROJ. 3145
N75-29340
N75-29567
AF PPOJ. 4643
N75-29610
N75-29983
AF PROJ. 5573
N75-29870
AF PROJ. 5620
N75-29932
AF PROJ. 5621
N75-29930
AF PROJ. 5730
N75-29886
AF PROJ. 6319
N75-29746
AF PROJ. 6672
N75-29310
AF PROJ. 6813
N75-29764
N75-29770
N75-29918
N75-29933
AF PROJ. 7040
N75-29309
AF PROJ. 7071
N75-29814
N75-29832
AF PROJ. 7164
N75-29397
AF PROJ. 7231
N75-29748
N75-29752
AF PROJ. 7340
N75-29232
AF PROJ. 7342
N75-29221
AF PROJ. 7600
N75-29159
AF PROJ. 7635
N75-29702
AF PROJ. 7660
N75-29395
AF PROJ. 7663
N75-29611
AF PROJ. 7757
N75-29753
N75-29755
AF PROJ. 7885
N75-29190
AF PROJ. 7996
N75-29754
AF PROJ. 8219
N75-29071
AF PROJ. 8600
N75-29625
N75-29973
AF PROJ. 8601
N75-29905
AF PROJ. 8607
N75-29615
N75-29618
N75-29619
N75-29972
AF PROJ. 8682
N75-29626
AF PROJ. 9711
N75-29268
AF PROJ. 9749
N75-29312
N75-29815
N75-29829
N75-29830
N75-29831
N75-29833
N75-29834
N75-29859
AF PROJ. 9751
N75-29612
N75-29620
N75-29900
N75-29901
N75-29904
AF PROJ. 9752
N75-29903
AF PROJ. 9761
N75-29933
N75-29934
AF PROJ. 9763
N75-29885
AF PROJ. 9764
N75-29918
AF PROJ. 9769
N75-29816
N75-29891
AF PROJ. 9778
N75-29307
N75-29765
N75-29766
N75-29797
AF PROJ. 9781
N75-29374
AF PROJ. 9782
N75-29493
AF-AFOSR-1328-67
N75-29855
AF-AFOSR-2119-71
N75-29609
AF-AFOSR-2133-71
N75-29621
AF-AFOSR-2168-72
N75-29610
AF-AFOSR-2185-72
N75-29815
AF-AFOSR-2186-72
N75-29984
AF-AFOSR-2199-72
N75-29918
AF-AFOSR-2273-72
N75-29849
AF-AFOSR-2274-72
N75-29863
AF-AFOSR-2288-72
N75-29834
AF-AFOSR-2319-72
N75-29855
AF-AFOSR-2332-72
N75-29900
N75-29901
AF-AFOSR-2339-72
N75-29904
AF-AFOSR-2347-72
N75-29983
AF-AFOSR-2389-72
N75-29859
AF-AFOSR-2492-73
N75-29816
AF-AFOSR-2516-73
N75-29801
AF-AFOSR-2547-73
N75-29312
AF-AFOSR-2591-74
N75-29493
AF-AFOSR-2592-74
N75-29829
N75-29830
N75-29831
N75-29833
N75-29839
AF-AFOSR-2661-74
N75-29812
AF-AFOSR-2663-74
N75-29268
ARPA ORDER 512
N75-29624
ARPA ORDER 720
N75-29446
ARPA ORDER 1562
N75-29931
ARPA ORDER 1807
N75-29234
ARPA ORDER 1827
N75-29621
N75-29622
ARPA ORDER 2116
N75-29395
ARPA ORDER 2175
N75-29414
ARPA ORDER 2252
N75-29420
ARPA ORDER 2254
N75-29813
ARPA ORDER 2397
N75-29329
ARPA ORDER 2494
N75-29799
N75-29809
N75-29811
ARPA ORDER 2517
N75-29790
ARPA ORDER 2551
N75-29623
AT(29-1)-789 N75-29183
CHAM PROJ. 950
N75-29211
DA PROJ. 1F1-62203-A-119
N75-29459
DA PROJ. 1F1-62203-AA-33
N75-29097
DA PROJ. 1F1-62203-AH-86
N75-29057
DA PROJ. 1F1-62808-A-170
N75-29462
DA PROJ. 1G1-62204-AA-71
N75-29123
DA PROJ. 1S0-62102-A-42
N75-29328
DA PROJ. 1S6-62703-A-057
N75-29335
DA PROJ. 1S6-62705-A-055
N75-29334
DA PROJ. 1S7-62705-AH-94
N75-29569
DA PROJ. 1T-161102-A-34A
N75-29873
DA PROJ. 1T0-61191-A-91A
N75-29491
DA PROJ. 1T0-62105-A-329
N75-29218
DA PROJ. 1T1-61102-B-11A
N75-29424
N75-29920
DA PROJ. 4A6-64717-D-895
N75-29494
DA-ARO(D)-31-124-73-G81
N75-29931
DA-ARO(D)-31-124-73-G162
N75-29424
DA-ARO(D)-31-124-462
N75-29825
N75-29826
N75-29827
N75-29828
DA-31-124-ARO(D)-462
N75-29836
DAAB05-73-C-2032
N75-29327
DAAB05-74-C-2524
N75-29338
DAAB07-72-C-0305
N75-29328
DAAB07-73-C-0175
N75-29335
DAAB07-73-C-0267
N75-29334
DAAD05-72-C-0427
N75-29440
DAAD05-74-C-0729
N75-29453
DAAE07-72-C-0277
N75-29441
DAAG17-73-C-0174
N75-29057
DAAG39-74-C-0128
N75-29806
N75-29807
N75-29808
DAAG46-72-C-0130
N75-29446
DAAG46-73-C-0250
N75-29218
DAAG46-74-C-0019
N75-29259
DAAH01-73-C-0408
N75-29418
DAAJ02-72-C-0067
N75-29097
DAAJ02-73-C-0085
N75-29123
DAAJ02-73-C-0094
N75-29459
DAAJ02-74-C-0005
N75-29462
DAAK02-71-C-0311
N75-29555
DAAK02-72-C-0529
N75-29795
DAAK02-73-C-0336
N75-29543
DAAK02-73-C-0493
N75-29554
DAEA18-73-A-0127
N75-29608
DAHC15-73-C-0080
N75-29813
DAHC15-73-C-0435
N75-29799
N75-29809
N75-29811
DASA01-70-C-0059
N75-29751
DI-BM-HO-220045
N75-29787

DI-14-16-0008-802 N75-29503
DI-14-31-0001-3582 N75-29586
DI-14-31-0001-3828 N75-29542
DI-14-31-0001-4032 N75-29544
DNA PROJ. NWED-PP-001 N75-29422
DNA PROJ. NWED-QAXE N75-29866
DNA PROJ. NWED-QAXM N75-29751
DNA PROJ. NWET-AAXT N75-29906
DNA001-73-C-0118 N75-29866
DNA001-74-C-0032 N75-29866
DNA001-74-C-0098 N75-29751
DNA001-74-C-0161 N75-29906
DOT-CG-31446-A N75-29082
DOT-FA69WS-162 N75-29081
DOT-FA70WA-2263 N75-29061
DOT-FA70WA-2448 N75-29064 N75-29065 N75-29068 N75-29073
DOT-FA71WAI-218 N75-29134 N75-29472
DOT-FA71WAI-223 N75-29572
DOT-FA72NA-728 N75-29288
DOT-FA72NA-741 N75-29083
DOT-FA72WA-2774 N75-29062
DOT-FA72WAI-238 N75-29730
DOT-FA72WAI-242 N75-29075 N75-29079
DOT-FA72WAI-261 N75-29078 N75-29287
DOT-FA72WAI-356 N75-29131 N75-29133 N75-29136
DOT-FA74WA-3518 N75-29077
DOT-FA74WAI-444 N75-29090
DOT-FA74WAI-468 N75-29113
DOT-FR-30041 N75-29957
DOT-HS-4-00813 N75-29317
DOT-HS-053-3-664 N75-29783 N75-29784
DOT-OS-40171 N75-29271
DRDA-74-342-B1 N75-29747
DTEN-73.70.195 N75-29437
EPA-R-801236 N75-29541
EPA-R-801419 N75-29584
EPA-R-802772 N75-29585
EPA-68-01-0123 N75-29590
EPA-68-01-0132 N75-29595
EPA-68-01-2276 N75-29592
EPA-68-02-0255 N75-29599
EPA-68-02-0629 N75-29596
EPA-68-02-1462 N75-29617
EPA-68-03-0244 N75-29600
EPA-68-03-0497 N75-29589
EQ5AC002 N75-29591
ESOC-TA/90/73-AR N75-29146
ESRO-SC/13/73-HQ N75-29303
ESRO-SC/45-HQ N75-29975
ESRO-1560/72 N75-29451
ESTEC-2019/73-35 N75-29452
ESTEC-2114/73-PP N75-29167 N75-29168
FEA-C-50068-00 N75-29953
F04611-73-C-0017 N75-29180
F04611-73-C-0050 N75-29886
F04611-74-C-0019 N75-29179
F04701-72-C-0435 N75-29402
F04701-73-C-0309 N75-29892
F08606-72-C-0029 N75-29058
F08606-73-C-0008 N75-29613
F08606-73-C-0037 N75-29060
F08606-74-C-0025 N75-29059 N75-29189
F08606-74-C-0049 N75-29623
F19628-72-C-0120 N75-29615 N75-29618 N75-29619 N75-29972
F19628-72-C-0136 N75-29932
F19628-72-C-0174 N75-29702
F19628-72-C-0255 N75-29611
F19628-73-C-002 N75-29079
F19628-73-C-0001 N75-29309
F19628-73-C-0002 N75-29075 N75-29078 N75-29311 N75-29624 N75-29946
F19628-73-C-0052 N75-29310
F19628-73-C-0120 N75-29905
F19628-73-C-0196 N75-29626
F19628-74-C-0061 N75-29805
F19628-74-C-0096 N75-29416
F19628-75-C-0001 N75-29804
F19828-C-0002 N75-29287
F30602-72-C-0019 N75-29537 N75-29538 N75-29539
F30602-75-C-0001 N75-29890
F33615-69-C-1232 N75-29768
F33615-70-C-1695 N75-29768
F33615-71-C-1892 N75-29752
F33615-71-C-1927 N75-29832
F33615-72-C-1024 N75-29072
F33615-72-C-1351 N75-29497
F33615-72-C-1375 N75-29071
F33615-72-C-2098 N75-29340
F33615-72-C-2142 N75-29395
F33615-73-C-2040 N75-29125
F33615-73-C-2064 N75-29567
F33615-73-C-3035 N75-29129
F33615-74-C-1074 N75-29395
F33615-74-C-3006 N75-29102
F33615-75-C-1001 N75-29814
F40600-73-C-0008 N75-29138
F41609-73-C-0035 N75-29753
F44620-70-C-0029 N75-29885
F44620-70-C-0105 N75-29307 N75-29764 N75-29765 N75-29766
F44620-71-C-0009 N75-29374
F44620-71-C-0040 N75-29926
F44620-71-C-0059 N75-29934
F44620-71-C-0072 N75-29769
F44620-72-C-0050 N75-29933
F44620-72-C-0058 N75-29620
F44620-72-C-0086 N75-29770
F44620-73-C-0007 N75-29612
F44620-73-C-0055 N75-29622
F44620-74-C-0009 N75-29797
F44620-74-C-0017 N75-29903
F44620-74-C-0058 N75-29891
HDL PROJ. 370432 N75-29873
HSM-99-73-75 N75-29785 N75-29786
HA-2-4214 N75-29270
HDA903-74-C-0288 N75-29790
HP51524015 N75-29756
HR-06645 N75-29811
HIN-DEP/PE-AT/2161/01/STR N75-29482
HIN-DEP/PE-K5A/82 N75-29053
NASA ORDER T-4114-B N75-29503
NASA ORDER W-13183 N75-29142
NASA ORDER W-13183-192 N75-29606
NASW-2208 N75-29386
NASW-2232 N75-29386
NASW-2481 N75-29140 N75-29971
NASW-2483 N75-29120 N75-29126 N75-29237 N75-29635 N75-29720 N75-29739 N75-29741
N75-29742 N75-29895
NASW-2671 N75-29211
NASW-2789 N75-29246 N75-29292 N75-29352 N75-29758
NASW-2790 N75-29171 N75-29245 N75-29357 N75-29358 N75-29721 N75-29775 N75-29776 N75-29777 N75-29780
NASW-2791 N75-29215 N75-29239 N75-29979 N75-29980
NASW-2792 N75-29214 N75-29385 N75-29731 N75-29732
NASW-2970 N75-29035
NAS1-10635 N75-29130
NAS1-10828 N75-29089
NAS1-12974 N75-29127
NAS1-13303 N75-29359 N75-29360 N75-29361
NAS1-13356 N75-29093
NAS1-13683 N75-29066
NAS2-2432 N75-29386
NAS2-7262 N75-29351
NAS2-7475 N75-29121
NAS2-7698 N75-29521
NAS2-7704 N75-29436
NAS2-7730 N75-29386
NAS2-8297 N75-29294
NAS2-8599 N75-29030
NAS3-14380 N75-29449
NAS3-17792 N75-29248
NAS3-17801 N75-29278
NAS3-17838 N75-29238
NAS3-17842 N75-29117
NAS3-18034 N75-29910
NAS3-18521 N75-29433
NAS3-19521 N75-29507 N75-29515
NAS5-11265 N75-29604
NAS5-11422 N75-29964
NAS5-20018 N75-29161 N75-29164
NAS5-20087 N75-29362
NAS5-20511 N75-29961
NAS5-20592 N75-29916
NAS5-20655 N75-29410
NAS5-20683 N75-29389
NAS5-20707 N75-29162
NAS5-20726 N75-29291
NAS5-20792 N75-29506
NAS5-20915 N75-29509
NAS5-21783 N75-29523
NAS5-21806 N75-29887
NAS5-21830 N75-29524
NAS5-21833 N75-29525
NAS5-21881 N75-29514
NAS5-21983 N75-29290 N75-29944
NAS5-22338 N75-29516
NAS5-23133 N75-29504 N75-29510
NAS5-24011 N75-29299
NAS6-2585 N75-29706
NAS7-100 N75-29277 N75-29289
NAS8-24000 N75-29383 N75-29387 N75-29531 N75-29532
NAS8-26376 N75-29986
NAS8-27541 N75-29818
NAS8-30301 N75-29962
NAS8-30534 N75-29388
NAS8-30742 N75-29170
NAS8-30749 N75-29174
NAS8-30929 N75-29247
NAS9-6988 N75-29186

NAS9-11118 N75-29740
NAS9-12200 N75-29137
N75-29145
N75-29293
N75-29942
N75-29943
NAS9-12330 N75-29166
NAS9-12402-061
N75-29169
NAS9-12776 N75-29821
NAS9-13003 N75-29216
NAS9-13138 N75-29778
N75-29779
NAS9-13247 N75-29163
N75-29165
NAS9-13301 N75-29519
NAS9-13332 N75-29505
N75-29508
N75-29511
N75-29517
N75-29518
N75-29522
NAS9-13606 N75-29135
NAS9-13657 N75-29132
NAS9-13692 N75-29356
NAS9-13703 N75-29820
NAS9-13979 N75-29264
NAS9-14016 N75-29528
N75-29529
N75-29530
N75-29534
N75-29536
NAS9-14041 N75-29088
NAS9-14171 N75-29407
NAS9-14316 N75-29908
NGL-15-005-112
N75-29528
N75-29530
NGL-15-005-186
N75-29527
NGL-16-001-002
N75-29604
NGL-22-007-006
N75-29977
NGL-22-009-124
N75-29849
NGL-25-001-054
N75-29514
NGL-31-003-020
N75-29907
NGL-32-003-001
N75-29958
NGL-39-009-003
N75-29603
NGL-39-009-172
N75-29031
NGL-39-011-085
N75-29937
NGL-48-008-057
N75-29978
NGR-03-003-001
N75-29963
NGR-05-017-010
N75-29852
NGR-05-020-668
N75-29969
NGR-09-015-002
N75-29535
NGR-10-022-001
N75-29513
NGR-16-002-038
N75-29038
NGR-23-005-528
N75-29474
NGR-33-015-160
N75-29249
NGR-36-004-055
N75-29109
NGR-39-009-204
N75-29743
NGR-39-010-104
N75-29386
NGR-39-010-149
N75-29386
NGR-39-030-010
N75-29386
NGR-44-001-117
N75-29605
N75-29985

NOAA-03-3-022-100
N75-29717
NOAA-04-3-158-3
N75-29712
NOAA-04-3-158-40
N75-29540
NR PROJ. 036-087
N75-29260
NR PROJ. 047-021
N75-29800
N75-29801
N75-29802
N75-29836
NR PROJ. 051-565
N75-29580
NR PROJ. 083-293
N75-29717
NR PROJ. 093-052
N75-29227
NR PROJ. 137-843
N75-29733
NR PROJ. 260-105
N75-29707
NR PROJ. 319-032
N75-29345
NR PROJ. 356-504
N75-29226
N75-29919
NR PROJ. 359-451
N75-29257
NR PROJ. 389-158
N75-29709
NRL PROJ. H02-30
N75-29422
NRL PROJ. R02-65
N75-29316
NRL PROJ. 7835
N75-29556
NSF AG-352 N75-29587
NSF C-505 N75-29141
N75-29144
N75-29970
NSF ENG-73-08107
N75-29810
NSF GA-32778 N75-29652
NSF GA-33446X1
N75-29603
NSF GA-36409 N75-29686
N75-29687
NSF GA-40494 N75-29664
NSF GI-29731 N75-29690
N75-29691
N75-29692
N75-29693
NSF GI-32989A2
N75-29587
NSF GI-34990 N75-29423
NSF GI-35179 N75-29269
NSF GI-42906 N75-29809
NSF GI-44210 N75-29552
N75-29570
NSF GK-36375 N75-29827
NSF GK-41647 N75-29849
NSF GP-8115 N75-29967
NSF GP-19400 N75-29967
NSF GP-27456 N75-29875
NSF GP-30400 N75-29967
NSF GP-31931 N75-29828
NSF GP-38867 N75-29801
N75-29836
NSF GT-39356 N75-29588
NSF P4P0460-000
N75-29798
NSF ST-42625 N75-29949
NSF 40130 N75-29378
NSG-1040 N75-29894
NSG-1081 N75-29115
NSG-3038 N75-29175
NSG-5018 N75-29512
N75-29526
NSG-7081 N75-29974
NSG-8002 N75-29914
N00014-67-A-0009
N75-29800
N00014-67-A-0019
N75-29967
N00014-67-A-0077-0011
N75-29867

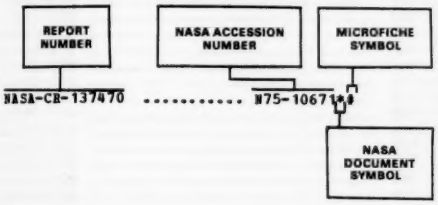
N00014-67-A-0077-0016
N75-29345
N00014-67-A-0103-0036
N75-29580
N00014-67-A-0115-0005
N75-29733
N00014-67-A-0126-0008
N75-29800
N75-29801
N75-29836
N00014-67-A-0126-0009
N75-29801
N75-29802
N75-29836
N00014-67-A-0151-0024
N75-29226
N75-29265
N75-29919
N00014-67-A-0201-0013
N75-29398
N75-29710
N75-29713
N75-29714
N75-29734
N00014-67-A-0204-0084
N75-29715
N00014-67-A-0232-0022
N75-29803
N00014-67-A-0305-0024
N75-29330
N00014-67-A-0404-0006
N75-29257
N00014-68-A-0196-0009
N75-29604
N00014-69-A-0060-0006
N75-29709
N00014-69-A-0200-1017
N75-29835
N75-29838
N00014-69-A-0200-4042
N75-29796
N00014-69-A-0200-6039
N75-29707
N00014-69-A-0200-6043
N75-29708
N00014-71-C-0176
N75-29227
N00014-73-A-0441-0001
N75-29375
N00014-73-C-0274
N75-29443
N00014-73-C-0397
N75-29341
N00014-73-C-0461
N75-29337
N00014-74-C-0243
N75-29420
N00014-74-C-0279
N75-29260
N00014-74-C-0393
N75-29308
N00014-75-C-0360
N75-29234
N00017-72-C-4401
N75-29099
N75-29124
N75-29152
N75-29313
N75-29314
N75-29415
N75-29791
N00019-74-C-0227
N75-29306
N00123-72-C-2215
N75-29414
N00123-74-C-0645
N75-29326
N62271-73-M-1022
N75-29869
N62399-73-C-0029
N75-29550
ONR PROJ. 10077
N75-29308
PROJ. A-1592 N75-29388
PROJ. HAC N75-29798
PS-207320G N75-29875
RR0110941 N75-29902
RR0220844 N75-29556
SP0130710 N75-29442

SP43422210 N75-29261
SP43422703 N75-29399
SW/1170/010/WPL
N75-29480
N75-29481
SRC-B/SE/8978
N75-29793
SR0230101 N75-29377
SWRI PROJ. 02-3825
N75-29453
SWRI PROJ. 02-3895
N75-29127
T-01-816-I-205
N75-29251
V-594P-454 N75-29559
N75-29560
N75-29561
N75-29562
XF52552700 N75-29716
ZR0000101 N75-29373
491-02 N75-29638
504-09-21-01 N75-29037
504-09-21-02 N75-29774
505-01 N75-29187
505-02-21-01 N75-29036
505-02-31-01 N75-29092
505-04 N75-29434
N75-29435
505-05 N75-29250
505-05-41-03 N75-29365
505-06-13 N75-29384
505-06-93-01 N75-29039
505-10-31 N75-29067
505-11-21-02 N75-29091
506-16-11-02-00-21
N75-29915
506-23 N75-29896
513-52-01-04 N75-29119
712-323-20-01-01
N75-29857
743-03 N75-29118
790-93-08-01 N75-29156
879-11-36-01 N75-29965
948-70-70-20 N75-29153
951-16-00-00-72
N75-29602

REPORT ACCESSION NUMBER INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 13 NUMBER 20

Typical Report/Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche. A plus sign (+) indicates a document that cannot be microfiched but for which one-to-one facsimile is available.

A-6077 ..... N75-29067*#
A-6159 ..... N75-29384*#
A-6173 ..... N75-29915*#

AAE-114 ..... N75-29815 #

AASU-336 ..... N75-29390 #

AC-29 ..... N75-29685 #

AD-A003590 ..... N75-29550 #
AD-A005040 ..... N75-29811 #
AD-A005041 ..... N75-29809 #
AD-A005043 ..... N75-29074 #
AD-A005051 ..... N75-29097 #
AD-A005088 ..... N75-29218 #
AD-A005166 ..... N75-29123 #
AD-A005271 ..... N75-29057 #
AD-A005273 ..... N75-29082 #
AD-A005279 ..... N75-29328 #
AD-A005293 ..... N75-29746 #
AD-A005304 ..... N75-29537 #
AD-A005305 ..... N75-29538 #
AD-A005306 ..... N75-29539 #
AD-A005321 ..... N75-29869 #
AD-A005568 ..... N75-29079 #
AD-A005569 ..... N75-29287 #
AD-A005577 ..... N75-29440 #
AD-A005631 ..... N75-29608 #
AD-A005636 ..... N75-29234 #
AD-A005666 ..... N75-29327 #
AD-A005669 ..... N75-29329 #
AD-A005699 ..... N75-29752 #
AD-A005714 ..... N75-29268 #
AD-A005718 ..... N75-29812 #
AD-A005723 ..... N75-29918 #
AD-A005733 ..... N75-29339 #
AD-A005734 ..... N75-29951 #
AD-A005735 ..... N75-29396 #
AD-A005736 ..... N75-29925 #
AD-A005737 ..... N75-29493 #
AD-A005763 ..... N75-29858 #
AD-A005765 ..... N75-29373 #
AD-A005768 ..... N75-29442 #
AD-A005769 ..... N75-29967 #
AD-A005773 ..... N75-29341 #
AD-A005775 ..... N75-29623 #
AD-A005782 ..... N75-29790 #
AD-A005783 ..... N75-29933 #
AD-A005784 ..... N75-29885 #
AD-A005785 ..... N75-29768 #
AD-A005786 ..... N75-29622 #
AD-A005787 ..... N75-29481 #
AD-A005815 ..... N75-29395 #
AD-A005820 ..... N75-29829 #
AD-A005821 ..... N75-29984 #
AD-A005822 ..... N75-29071 #
AD-A005823 ..... N75-29830 #
AD-A005824 ..... N75-29906 #
AD-A005825 ..... N75-29866 #
AD-A005826 ..... N75-29813 #
AD-A005827 ..... N75-29805 #
AD-A005828 ..... N75-29707 #
AD-A005829 ..... N75-29814 #
AD-A005831 ..... N75-29931 #
AD-A005865 ..... N75-29419 #
AD-A005867 ..... N75-29400 #
AD-A005869 ..... N75-29704 #
AD-A005876 ..... N75-29788 #
AD-A005877 ..... N75-29377 #
AD-A005880 ..... N75-29261 #
AD-A005881 ..... N75-29316 #
AD-A005885 ..... N75-29816 #
AD-A005891 ..... N75-29837 #
AD-A005893 ..... N75-29472 #
AD-A005894 ..... N75-29715 #
AD-A005897 ..... N75-29064 #
AD-A005898 ..... N75-29756 #
AD-A005900 ..... N75-29836 #
AD-A005901 ..... N75-29802 #
AD-A005902 ..... N75-29801 #
AD-A005903 ..... N75-29800 #
AD-A005909 ..... N75-29717 #
AD-A005911 ..... N75-29265 #
AD-A005915 ..... N75-29257 #
AD-A005916 ..... N75-29838 #
AD-A005918 ..... N75-29566 #
AD-A005948 ..... N75-29439 #
AD-A005950 ..... N75-29393 #
AD-A005953 ..... N75-29438 #
AD-A005954 ..... N75-29220 #
AD-A005957 ..... N75-29342 #
AD-A005959 ..... N75-29344 #
AD-A005965 ..... N75-29499 #
AD-A005966 ..... N75-29421 #
AD-A005967 ..... N75-29923 #
AD-A005970 ..... N75-29893 #
AD-A005971 ..... N75-29343 #
AD-A005975 ..... N75-29445 #
AD-A005978 ..... N75-29568 #
AD-A005979 ..... N75-29922 #
AD-A005980 ..... N75-29921 #
AD-A005982 ..... N75-29258 #
AD-A005984 ..... N75-29255 #
AD-A005986 ..... N75-29730 #
AD-A005987 ..... N75-29154 +
AD-A005988 ..... N75-29285 #
AD-A005991 ..... N75-29225 #
AD-A005993/1 ..... N75-29224 #
AD-A005994 ..... N75-29223 #
AD-A005995 ..... N75-29222 #
AD-A005997 ..... N75-29498 #
AD-A006002 ..... N75-29336 #
AD-A006005 ..... N75-29256 #
AD-A006007 ..... N75-29184 #
AD-A006008 ..... N75-29229 #
AD-A006010 ..... N75-29230 #
AD-A006011 ..... N75-29231 #
AD-A006012 ..... N75-29228 #
AD-A006015 ..... N75-29494 #
AD-A006017 ..... N75-29873 #
AD-A006018 ..... N75-29701 #
AD-A006026 ..... N75-29615 #
AD-A006027 ..... N75-29924 #
AD-A006032 ..... N75-29413 #
AD-A006036 ..... N75-29375 #
AD-A006038 ..... N75-29280 #
AD-A006039 ..... N75-29233 #
AD-A006042 ..... N75-29189 #
AD-A006043 ..... N75-29058 #
AD-A006044 ..... N75-29060 #
AD-A006045 ..... N75-29059 #
AD-A006074 ..... N75-29928 #
AD-A006075 ..... N75-29697 #
AD-A006076 ..... N75-29394 #
AD-A006078 ..... N75-29372 #
AD-A006079 ..... N75-29565 #

AD-A006080 ..... N75-29333 #
AD-A006081 ..... N75-29889 #
AD-A006082 ..... N75-29564 #
AD-A006083 ..... N75-29874 #
AD-A006087 ..... N75-29371 #
AD-A006088 ..... N75-29332 #
AD-A006092 ..... N75-29927 #
AD-A006093 ..... N75-29563 #
AD-A006095 ..... N75-29151 #
AD-A006097 ..... N75-29929 #
AD-A006099 ..... N75-29444 #
AD-A006101 ..... N75-29414 #
AD-A006103 ..... N75-29458 #
AD-A006105 ..... N75-29890 #
AD-A006107 ..... N75-29340 #
AD-A006108 ..... N75-29125 #
AD-A006109 ..... N75-29483 #
AD-A006110 ..... N75-29159 #
AD-A006112 ..... N75-29625 #
AD-A006113 ..... N75-29870 #
AD-A006114 ..... N75-29124 #
AD-A006115 ..... N75-29152 #
AD-A006116 ..... N75-29313 #
AD-A006117 ..... N75-29415 #
AD-A006118 ..... N75-29314 #
AD-A006119 ..... N75-29791 #
AD-A006121 ..... N75-29749 #
AD-A006123 ..... N75-29310 #
AD-A006126 ..... N75-29702 #
AD-A006128 ..... N75-29626 #
AD-A006131 ..... N75-29462 #
AD-A006136 ..... N75-29425 #
AD-A006137 ..... N75-29754 #
AD-A006138 ..... N75-29397 #
AD-A006140 ..... N75-29496 #
AD-A006148 ..... N75-29920 #
AD-A006149 ..... N75-29569 #
AD-A006150 ..... N75-29491 #
AD-A006154 ..... N75-29832 #
AD-A006155 ..... N75-29769 #
AD-A006156 ..... N75-29232 #
AD-A006159 ..... N75-29102 #
AD-A006160 ..... N75-29221 #
AD-A006168 ..... N75-29190 #
AD-A006190 ..... N75-29459 #
AD-A006191 ..... N75-29815 #
AD-A006192 ..... N75-29309 #
AD-A006193 ..... N75-29804 #
AD-A006194 ..... N75-29624 #
AD-A006197 ..... N75-29424 #
AD-A006198 ..... N75-29543 #
AD-A006200 ..... N75-29611 #
AD-A006201 ..... N75-29983 #
AD-A006202 ..... N75-29610 #
AD-A006204 ..... N75-29418 #
AD-A006211 ..... N75-29892 #
AD-A006223 ..... N75-29904 #
AD-A006226 ..... N75-29453 #
AD-A006229 ..... N75-29764 #
AD-A006230 ..... N75-29891 #
AD-A006232 ..... N75-29609 #
AD-A006233 ..... N75-29831 #
AD-A006234 ..... N75-29903 #
AD-A006235 ..... N75-29180 #
AD-A006236 ..... N75-29179 #
AD-A006237 ..... N75-29886 #
AD-A006239 ..... N75-29582 #
AD-A006240 ..... N75-29770 #
AD-A006241 ..... N75-29581 #
AD-A006242 ..... N75-29612 #
AD-A006244 ..... N75-29833 #
AD-A006249 ..... N75-29711 #
AD-A006251 ..... N75-29315 #
AD-A006252 ..... N75-29422 #
AD-A006253 ..... N75-29716 #
AD-A006255 ..... N75-29703 #
AD-A006256 ..... N75-29401 #
AD-A006257 ..... N75-29335 #
AD-A006258 ..... N75-29334 #
AD-A006259 ..... N75-29446 #
AD-A006260 ..... N75-29259 #
AD-A006261 ..... N75-29839 #
AD-A006263 ..... N75-29076 #
AD-A006269 ..... N75-29399 #
AD-A006274 ..... N75-29734 #
AD-A006275 ..... N75-29714 #
AD-A006276 ..... N75-29803 #
AD-A006278 ..... N75-29326 #
AD-A006279 ..... N75-29306 #

AD-A006281 ..... N75-29398 #
AD-A006282 ..... N75-29710 #
AD-A006283 ..... N75-29099 #
AD-A006294 ..... N75-29799 #
AD-A006296 ..... N75-29308 #
AD-A006298 ..... N75-29420 #
AD-A006299 ..... N75-29260 #
AD-A006321 ..... N75-29713 #
AD-A006322 ..... N75-29376 #
AD-A006323 ..... N75-29867 #
AD-A006324 ..... N75-29345 #
AD-A006328 ..... N75-29919 #
AD-A006335 ..... N75-29460 #
AD-A006340 ..... N75-29461 #
AD-A006342 ..... N75-29767 #
AD-A006344 ..... N75-29457 #
AD-A006345 ..... N75-29750 #
AD-A006346 ..... N75-29733 #
AD-A006347 ..... N75-29844 #
AD-A006348 ..... N75-29458 #
AD-A006349 ..... N75-29417 #
AD-A006350 ..... N75-29939 #
AD-A006351 ..... N75-29938 #
AD-A006352 ..... N75-29765 #
AD-A006353 ..... N75-29766 #
AD-A006354 ..... N75-29330 #
AD-A006356 ..... N75-29583 #
AD-A006359 ..... N75-29950 #
AD-A006360 ..... N75-29940 #
AD-A006361 ..... N75-29835 #
AD-A006362 ..... N75-29618 #
AD-A006363 ..... N75-29619 #
AD-A006364 ..... N75-29972 #
AD-A006365 ..... N75-29888 #
AD-A006369 ..... N75-29455 #
AD-A006370 ..... N75-29331 #
AD-A006384 ..... N75-29307 #
AD-A006388 ..... N75-29753 #
AD-A006389 ..... N75-29755 #
AD-A006390 ..... N75-29138 #
AD-A006393 ..... N75-29709 #
AD-A006395 ..... N75-29748 #
AD-A006396 ..... N75-29930 #
AD-A006397 ..... N75-29973 #
AD-A006401 ..... N75-29796 #
AD-A006402 ..... N75-29501 #
AD-A006405 ..... N75-29311 #
AD-A006406 ..... N75-29946 #
AD-A006408 ..... N75-29905 #
AD-A006409 ..... N75-29932 #
AD-A006410 ..... N75-29416 #
AD-A006411 ..... N75-29129 #
AD-A006412 ..... N75-29497 #
AD-A006416 ..... N75-29088 #
AD-A006422 ..... N75-29934 #
AD-A006424 ..... N75-29797 #
AD-A006426 ..... N75-29083 #
AD-A006427 ..... N75-29567 #
AD-A006428 ..... N75-29751 #
AD-A006434 ..... N75-29771 #
AD-A006435 ..... N75-29101 #
AD-A006436 ..... N75-29072 #
AD-A006437 ..... N75-29613 #
AD-A006439 ..... N75-29085 #
AD-A006447 ..... N75-29557 #
AD-A006458 ..... N75-29834 #
AD-A006459 ..... N75-29312 #
AD-A006460 ..... N75-29374 #
AD-A006461 ..... N75-29900 #
AD-A006464 ..... N75-29620 #
AD-A006465 ..... N75-29926 #
AD-A006466 ..... N75-29859 #
AD-A006467 ..... N75-29621 #
AD-A006468 ..... N75-29227 #
AD-A006470 ..... N75-29708 #
AD-A006471 ..... N75-29580 #
AD-A006473 ..... N75-29558 #
AD-A006476 ..... N75-29337 #
AD-A006478 ..... N75-29456 #
AD-A006481 ..... N75-29226 #
AD-A006482 ..... N75-29402 #
AD-A006489 ..... N75-29901 #
AD-A006500 ..... N75-29947 #
AD-A006502 ..... N75-29795 #
AD-A006505 ..... N75-29100 #
AD-A006506 ..... N75-29098 #
AD-A006508 ..... N75-29948 #
AD-A006518 ..... N75-29976*#
AD-A006539 ..... N75-29827 #

AD-A006541 ..... N75-29826 #
AD-A006543 ..... N75-29828 #
AD-A006544 ..... N75-29825 #
AD-A006546 ..... N75-29338 #
AD-A006548 ..... N75-29554 #
AD-A006549 ..... N75-29555 #
AD-A006552 ..... N75-29902 #
AD-A006553 ..... N75-29556 #
AD-A006665/4 ..... N75-29465
AD-A007843 ..... N75-29806 #
AD-A007844 ..... N75-29807 #
AD-A007845 ..... N75-29808 #
AD-A008519 ..... N75-29945 #
AD-A008925 ..... N75-29288 #
AD-A009010 ..... N75-29136 #
AD-A009011 ..... N75-29073 #
AD-A009012 ..... N75-29134 #
AD-A009215 ..... N75-29068 #
AD-A009307 ..... N75-29081 #
AD-A009342 ..... N75-29133 #
AD-A009429 ..... N75-29078 #
AD-A009656 ..... N75-29090 #
AD-A009662 ..... N75-29131 #
AD-A009663 ..... N75-29113 #
AD-A009665 ..... N75-29636 #
AD-A009881 ..... N75-29077 #
AD-A009882 ..... N75-29572 #
AD-A009883 ..... N75-29062 #
AD-A009884 ..... N75-29061 #
AD-A010008 ..... N75-29080 #
AD-A010009 ..... N75-29319 #
AD-A010036/2 ..... N75-29272
AD-A010111 ..... N75-29065 #
AD-A010266 ..... N75-29063 #
AD-A010478 ..... N75-29075 #

AD-786273 ..... N75-29286 #

ADL-C-76971 ..... N75-29271 #
ADL-C-77207 ..... N75-29264*#

ADLC-77382 ..... N75-29953 #

AEDC-TR-74-82 ..... N75-29425 #
AEDC-TR-74-128 ..... N75-29138 #

AEROCHEM-TP-302A ..... N75-29180 #

AEWES-TR-M-71-7 ..... N75-29976*#

AFAL-TR-340 ..... N75-29395 #

AFAPL-TR-74-88 ..... N75-29340 #
AFAPL-TR-74-93 ..... N75-29125 #
AFAPL-TR-74-111 ..... N75-29567 #

AFCEC-TR-74-7 ..... N75-29496 #

AFCRL-APSIG-287 ..... N75-29159 #

AFCRL-ERP-487 ..... N75-29625 #
AFCRL-ERP-497 ..... N75-29973 #

AFCRL-PSRP-609 ..... N75-29870 #
AFCRL-PSRP-614 ..... N75-29930 #
AFCRL-PSRP-616 ..... N75-29413 #
AFCRL-PSRP-619 ..... N75-29888 #

AFCRL-SR-186 ..... N75-29501 #

AFCRL-TR-73-0352 ..... N75-29310 #
AFCRL-TR-74-0035 ..... N75-29905 #
AFCRL-TR-74-0217 ..... N75-29159 #
AFCRL-TR-74-0391 ..... N75-29618 #
AFCRL-TR-74-0394 ..... N75-29611 #
AFCRL-TR-74-0451 ..... N75-29619 #
AFCRL-TR-74-0472 ..... N75-29625 #
AFCRL-TR-74-0496 ..... N75-29702 #
AFCRL-TR-74-0506 ..... N75-29615 #
AFCRL-TR-74-0509 ..... N75-29972 #
AFCRL-TR-74-0536 ..... N75-29870 #
AFCRL-TR-74-0583 ..... N75-29930 #
AFCRL-TR-74-0595 ..... N75-29413 #
AFCRL-TR-74-0609 ..... N75-29932 #
AFCRL-TR-74-0626 ..... N75-29888 #
AFCRL-TR-74-0633 ..... N75-29626 #
AFCRL-TR-75-0005 ..... N75-29416 #
AFCRL-TR-75-0008 ..... N75-29973 #
AFCRL-TR-75-0015 ..... N75-29983 #
AFCRL-TR-75-0016 ..... N75-29610 #

AFETR-75-10 ..... N75-29189 #
AFETR-75-11 ..... N75-29058 #
AFETR-75-12 ..... N75-29060 #
AFETR-75-16 ..... N75-29059 #

AFFDL-TR-74-83 ..... N75-29129 #
AFFDL-TR-74-97-VOL-2 ..... N75-29497 #
AFFDL-TR-74-130-VOL-1 ..... N75-29071 #
AFFDL-TR-74-148 ..... N75-29102 #
AFFDL-TR-75-6 ..... N75-29072 #

AFHRL-TR-74-57-VOL-2-PT-2 ..... N75-29768 #

AFLRL-54 ..... N75-29440 #

AFML-TR-73-280 ..... N75-29221 #
AFML-TR-74-163 ..... N75-29232 #

AFOSR-74-0251TR ..... N75-29831 #
AFOSR-74-0407TR ..... N75-29900 #
AFOSR-75-0162TR ..... N75-29612 #
AFOSR-75-0163TR ..... N75-29984 #
AFOSR-75-0172TR ..... N75-29268 #
AFOSR-75-0178TR ..... N75-29891 #
AFOSR-75-0180TR ..... N75-29830 #
AFOSR-75-0219TR ..... N75-29933 #
AFOSR-75-0246TR ..... N75-29829 #
AFOSR-75-0247TR ..... N75-29833 #
AFOSR-75-0248TR ..... N75-29839 #
AFOSR-75-0250TR ..... N75-29904 #
AFOSR-75-0253TR ..... N75-29903 #
AFOSR-75-0262TR-PT-1 ..... N75-29815 #
AFOSR-75-0272TR ..... N75-29609 #
AFOSR-75-0273TR ..... N75-29816 #
AFOSR-75-0298TR-PT-A ..... N75-29622 #
AFOSR-75-0302TR ..... N75-29764 #
AFOSR-75-0303TR ..... N75-29918 #
AFOSR-75-0304TR ..... N75-29885 #
AFOSR-75-0306TR..... N75-29770 #
AFOSR-75-0307TR ..... N75-29769 #
AFOSR-75-0308TR ..... N75-29834 #
AFOSR-75-0309TR ..... N75-29312 #
AFOSR-75-0311TR ..... N75-29620 #
AFOSR-75-0314TR ..... N75-29621 #
AFOSR-75-0315TR ..... N75-29859 #
AFOSR-75-0319TR ..... N75-29797 #
AFOSR-75-0320TR ..... N75-29926 #
AFOSR-75-0328TR ..... N75-29493 #
AFOSR-75-0339TR ..... N75-29812 #
AFOSR-75-0378TR ..... N75-29901 #
AFOSR-75-0382TR ..... N75-29374 #
AFOSR-75-0383TR ..... N75-29934 #
AFOSR-75-0385TR ..... N75-29307 #
AFOSR-75-0409TR ..... N75-29765 #
AFOSR-75-0410TR ..... N75-29766 #

AFRPL-TR-74-59 ..... N75-29180 #
AFRPL-TR-74-83 ..... N75-29179 #
AFRPL-TR-75-2 ..... N75-29886 #

AFWL-TR-74-303 ..... N75-29582 #

AGARD-AG-210 ..... N75-29736 #

AGARD-AR-81 ..... N75-29114 #

AGARD-CP-154 ..... N75-29722 #

AGARDOGRAPH-210 ..... N75-29736 #

AGMC-SWR-115-74-1 ..... N75-29085 #

AGMC-74-044 ..... N75-29085 #

AMMRC-CTR-74-68 ..... N75-29259 #
AMMRC-CTR-74-69 ..... N75-29446 #

AMRL-TR-73-24 ..... N75-29752 #
AMRL-TR-74-99 ..... N75-29748 #

AOEL-68 ..... N75-29707 #

APCRL-TR-74-0608 ..... N75-29501 #

APL-TG-610-6-REV ..... N75-29124 #
APL-TG-1254 ..... N75-29152 #

APL-TG-1265 ..... N75-29313 #
APL-TG-1266 ..... N75-29415 #
APL-TG-1267 ..... N75-29314 #
APL-TG-1269 ..... N75-29791 #

APL-TR-1257 ..... N75-29099 #

APTIC-75095 ..... N75-29594 #
APTIC-75097 ..... N75-29597 #

ARAP-230 ..... N75-29102 #

ARC-CP-1303 ..... N75-29367 #
ARC-CP-1305 ..... N75-29483 #
ARC-CP-1306 ..... N75-29484 #
ARC-CP-1307-PT-1 ..... N75-29046 #
ARC-CP-1308 ..... N75-29043 #
ARC-CP-1309-PT-3 ..... N75-29047 #
ARC-CP-1310 ..... N75-29048 #
ARC-CP-1311 ..... N75-29049 #
ARC-CP-1313 ..... N75-29050 #
ARC-CP-1314 ..... N75-29485 #
ARC-CP-1315 ..... N75-29051 #

ARC-R/M-3753 ..... N75-29094 #
ARC-R/M-3754 ..... N75-29040 #
ARC-R/M-3755 ..... N75-29392 #
ARC-R/M-3756 ..... N75-29041 #
ARC-R/M-3757 ..... N75-29042 #
ARC-R/M-3759 ..... N75-29052 #
ARC-R/M-3760 ..... N75-29053 #
ARC-R/M-3765 ..... N75-29054 #

ARC-33753 ..... N75-29484 #
ARC-34160 ..... N75-29042 #
ARC-34469 ..... N75-29052 #
ARC-34645 ..... N75-29049 #
ARC-34703 ..... N75-29094 #
ARC-34738 ..... N75-29367 #
ARC-34897 ..... N75-29048 #
ARC-34954 ..... N75-29041 #
ARC-35018 ..... N75-29040 #
ARC-35091 ..... N75-29392 #
ARC-35094 ..... N75-29047 #
ARC-35095 ..... N75-29043 #
ARC-35096 ..... N75-29046 #
ARC-35211 ..... N75-29054 #
ARC-35284 ..... N75-29483 #
ARC-35352 ..... N75-29053 #
ARC-35433 ..... N75-29485 #
ARC-35501 ..... N75-29051 #
ARC-35564 ..... N75-29050 #

ARD-550 ..... N75-29730 #

ARI-RR-55 ..... N75-29886 #

ARL-74-12/AFOSR-74-7 ..... N75-29764 #
ARL-74-17/AFOSR-74-12 ..... N75-29307 #
ARL-74-20/AFOSR-74-14 ..... N75-29766 #
ARL-74-21/AFOSR-74-15 ..... N75-29765 #
ARL-74-0139 ..... N75-29832 #
ARL-75-0064 ..... N75-29814 #
ARL-75-0071 ..... N75-29190 #

ARL/A-NOTE-349 ..... N75-29034 #
ARL/ME-NOTE-354 ..... N75-29111 #
ARL/SM-354 ..... N75-29244 #

ARO-ORD-TR-74-41 ..... N75-29425 #

ASD/XR-74-9 ..... N75-29101 #

ASE-3654 ..... N75-29964*#

ASEL-TR-174-3 ..... N75-29351*#

ATC-37 ..... N75-29287 #
ATC-38 ..... N75-29079 #
ATC-39 ..... N75-29075 #
ATC-41 ..... N75-29078 #

ATL-TM-183 ..... N75-29360*#

ATL-TR-213 ..... N75-29361*#
ATL-TR-215 ..... N75-29359*#

AVSD-0055-75-RR ..... N75-29916*#

BBC-RD-1975/1 ..... N75-29281
BBC-RD-1975/20 ..... N75-29282

BBN-2992 ..... N75-29797 #

BLL-CE-TRAN-6544-(9022.09) N75-29470

BLL-CE-TRANS-6607-(9022.09) N75-29347
BLL-CE-TRANS-6643-(9022.09) N75-29427

BLL-LTI-746-01460-(9022.401) N75-29235

BLL-M-23559-(5828.4F) N75-29405
BLL-M-23564-(5828.4F) N75-29860
BLL-M-23619-(5828.4F) N75-29601
BLL-M-23632-(5828.4F) N75-29627
BLL-M-23679-(5828.4F) N75-29705
BLL-M-23690-(5828.4F) N75-29632
BLL-M-23691-(5828.4F) N75-29817
BLL-M-23692-(5828.4F) N75-29634
BLL-M-23693-(5828.4F) N75-29633
BLL-M-23694-(5828.4F) N75-29631
BLL-M-23707-(5828.4F) N75-29428
BLL-M-23714-(5828.4F) N75-29139

BLL-NEL-TT-2564-(6075.461) N75-29463

BLL-PO-3206-(9022.81) ..... N75-29283 #

BLL-RAE-TRANS-5207-(1609) N75-29448
BLL-RAE-TRANS-5207-(1765) N75-29936

BLL-RTS-9364 ..... N75-29349
BLL-RTS-9414 ..... N75-29348
BLL-RTS-9548 ..... N75-29935
BLL-RTS-9849 ..... N75-29571

BM-IC-8638 ..... N75-29545 #

BM-OFR-26-75 ..... N75-29787 #

BM-RI-8016 ..... N75-29379 #
BM-RI-8019 ..... N75-29219 #
BM-RI-8023 ..... N75-29598 #

BM-TPR-88 ..... N75-29614 #

BMFT-FB-T-74-42 ..... N75-29954 #
BMFT-FB-T-74-44 ..... N75-29304 #

BRL-CR-179 ..... N75-29424 #

BR34131 ..... N75-29482 #
BR43094 ..... N75-29148 #
BR43578 ..... N75-29157 #
BR43678 ..... N75-29149 #
BR43991 ..... N75-29391 #
BR44085 ..... N75-29147 #
BR44152 ..... N75-29301 #
BR44348 ..... N75-29300 #
BR44792 ..... N75-29781 #
BR44993 ..... N75-29150 #
BR44996 ..... N75-29782 #

C-77096 ..... N75-29362*#

CALSPAN-BK-5345-A-1 ..... N75-29138 #

CALSPAN-ZS-5352-V-2-VOL-1 ..... N75-29783 #
CALSPAN-ZS-5352-V-3-VOL-2 ..... N75-29784 #

CCS-182 ..... N75-29802 #
CCS-187 ..... N75-29801 #
CCS-190 ..... N75-29836 #
CCS-210 ..... N75-29800 #

CEL-CR-75.003-VOL-3 ..... N75-29550 #

CERL-TR-E-59 ..... N75-29581 #

CERL-TR-M-118 ..... N75-29494 #

CFHR-3-5-72-176-2 ..... N75-29495 #

CL-1974-13-PT-5 ..... N75-29917 #
CL-1974-23 ..... N75-29744 #

CNES-NT-10 ..... N75-29096 #

CNES-NT-11 ..... N75-29325 #

COM-75-10364/8 ..... N75-29694 #
COM-75-10365/5 ..... N75-29695 #
COM-75-10366/3 ..... N75-29696 #
COM-75-10395/2 ..... N75-29404 #
COM-75-10435/6 ..... N75-29698 #
COM-75-10439/8 ..... N75-29616 #
COM-75-10466/1 ..... N75-29270 #
COM-75-10473/7 ..... N75-29492 #
COM-75-10477/8 ..... N75-29712 #
COM-75-10481/0 ..... N75-29700 #
COM-75-10500/7 ..... N75-29553 #
COM-75-10504/9 ..... N75-29540 #
COM-75-10509/8 ..... N75-29593 #
COM-75-10511/4 ..... N75-29699 #

CRC-1275 ..... N75-29298 #
CRC-1276-1-VOL-1 ..... N75-29296 #
CRC-1276-2 ..... N75-29297 #

CRDV-4016/75 ..... N75-29412 #
CRDV-4017/75 ..... N75-29411 #

CRIF-MT-93 ..... N75-29479 #

CRREL-TR-256 ..... N75-29701 #

D-43 ..... N75-29064 #

DDC-TR-75-1 ..... N75-29947 #

DGS-212 ..... N75-29618 #
DGS-213 ..... N75-29615 #
DGS-214 ..... N75-29619 #
DGS-215 ..... N75-29972 #

DLR-FB-73-64 ..... N75-29936

DLR-MITT-75-05 ..... N75-29070 #

DM-13 ..... N75-29686 #
DM-14 ..... N75-29687 #

DMS-DR-2198 ..... N75-29165*#
DMS-DR-2223 ..... N75-29163*#

DNA-3411T ..... N75-29866 #
DNA-3463T ..... N75-29751 #
DNA-3512T ..... N75-29906 #

DOT-HS-801-431 ..... N75-29783 #
DOT-HS-801-452 ..... N75-29317 #

DOT-TSC-OST-74-18 ..... N75-29955 #
DOT-TSC-OST-75-6 ..... N75-29086 #

DPG-DR-C62CA ..... N75-29401 #

DREO-R-704 ..... N75-29557 #

DREV-R-4016/75 ..... N75-29412 #
DREV-R-4017/75 ..... N75-29411 #

DREV-4011/75 ..... N75-29406 #

DS/HE/74-2 ..... N75-29233 #

DSIS-TM-1/75(DIP) ..... N75-29945 #

D6-41900 ..... N75-29117*#
D180-18673-1-VOL-1 ..... N75-29238*#
D180-18850-1 ..... N75-29449*#
D0824 ..... N75-29164*#
D2459-9500001-VOL-2 ..... N75-29497 #

E-8044 ..... N75-29155*#
E-8135 ..... N75-29118*#
E-8164 ..... N75-29434*#
E-8258 ..... N75-29435*#
E-8274 ..... N75-29473*#
E-8286 ..... N75-29250*#
E-8292 ..... N75-29638*#
E-8316 ..... N75-29896*#
E-8332 ..... N75-29187*#
E-8391 ..... N75-29242*#
E-8392 ..... N75-29909*#
E-8396 ..... N75-29241*#
E-8400 ..... N75-29429*#
E-8403 ..... N75-29546*#
E-8416 ..... N75-29108*#
E-8417 ..... N75-29243*#
E-8422 ..... N75-29353*#
E-8426 ..... N75-29284*#
E-8429 ..... N75-29172*#
E-8434 ..... N75-29110*#
E-8435 ..... N75-29107*#
E-8436 ..... N75-29106*#
E-8437 ..... N75-29128*#
E-8443 ..... N75-29173*#

ECOM-72-0305-F ..... N75-29328 #
ECOM-73-0175-F ..... N75-29335 #
ECOM-74-4 ..... N75-29608 #
ECOM-0267-3-73 ..... N75-29334 #
ECOM-4292 ..... N75-29569 #

ED-2002-1777 ..... N75-29387*#

EDR-8317 ..... N75-29433*#

EE-MSFC-1900 ..... N75-29986*#

EE-74-5 ..... N75-29609 #

ENVPREDRSCHF-TECH-PAPER-2-75 ..... N75-29703 #

EPA-440/1-74-006-A ..... N75-29579 #
EPA-440/1-74-019-D ..... N75-29576 #
EPA-440/1-74-029-A ..... N75-29575 #
EPA-440/1-75-036-B ..... N75-29577 #
EPA-440/1-75-042-A ..... N75-29578 #
EPA-450/1-75-001 ..... N75-29597 #
EPA-450/2-74-018A ..... N75-29573 #
EPA-450/3-73-006B ..... N75-29599 #
EPA-450/3-74-061 ..... N75-29617 #
EPA-530/SW-102C ..... N75-29592 #
EPA-600/5-75-003 ..... N75-29584 #
EPA-620/2-74-095A ..... N75-29600 #
EPA-640/3-75-002-A ..... N75-29589 #
EPA-650/2-74-009D ..... N75-29596 #
EPA-650/4-75-006 ..... N75-29594 #
EPA-670/2-74-097 ..... N75-29585 #
EPA-670/2-75-004 ..... N75-29590 #
EPA-670/2-75-006 ..... N75-29541 #
EPA-670/4-75-002 ..... N75-29403 #

EPRF-CP-NOTE-18 ..... N75-29869 #

EQ-5AC0021375 ..... N75-29591 #

ER-2497 ..... N75-29555 #

ERIM-104600-34-L ..... N75-29508*#
ERIM-104600-36-L ..... N75-29511*#
ERIM-104600-38-L ..... N75-29517*#
ERIM-104600-40-L ..... N75-29518*#
ERIM-104600-42-L ..... N75-29522*#
ERIM-193300-68-F ..... N75-29523*#

ERL-M467 ..... N75-29835 #
ERL-M481 ..... N75-29838 #

ESD-TR-74-307 ..... N75-29805 #
ESD-TR-74-314 ..... N75-29804 #
ESD-TR-74-344 ..... N75-29624 #
ESD-TR-75-1 ..... N75-29311 #
ESD-TR-75-106 ..... N75-29946 #

ESDU-01.01.00 ..... N75-29464 +
ESDU-02.03.02 ..... N75-29469 +
ESDU-02.04.00 ..... N75-29028 +
ESDU-02.05.01 ..... N75-29468 +
ESDU-71001 ..... N75-29203 +
ESDU-71002 ..... N75-29207 +
ESDU-71003 ..... N75-29346 +
ESDU-71022 ..... N75-29205 +
ESDU-71023 ..... N75-29206 +
ESDU-71024 ..... N75-29204 +
ESDU-72006 ..... N75-29209 +
ESDU-72007 ..... N75-29208 +
ESDU-72025 ..... N75-29029 +
ESDU-72028 ..... N75-29210 +
ESDU-73008 ..... N75-29201 +
ESDU-73009 ..... N75-29200 +
ESDU-73029 ..... N75-29202 +
ESDU-74001 ..... N75-29104 +
ESDU-74002 ..... N75-29103 +

ESDU-74003 ..... N75-29185 +
ESDU-74004 ..... N75-29868 +
ESDU-74007 ..... N75-29199 +
ESDU-74014 ..... N75-29198 +
ESDU-74023 ..... N75-29197 +
ESDU-74024 ..... N75-29196 +
ESDU-74032 ..... N75-29194 +
ESDU-74034 ..... N75-29195 +
ESDU-74039 ..... N75-29467 +
ESDU-75002 ..... N75-29466 +
ESDU-75003 ..... N75-29193 +

ESL-3824-2 ..... N75-29326 #
ESL-3863-3 ..... N75-29290*#
ESL-3863-4 ..... N75-29944*#

ESRO-CR(P)-633 ..... N75-29167 #
ESRO-CR(P)-638 ..... N75-29168 #
ESRO-CR(P)-639 ..... N75-29975 #
ESRO-CR(P)-644 ..... N75-29303 #
ESRO-CR(P)-646 ..... N75-29451 #
ESRO-CR(P)-647 ..... N75-29146 #
ESRO-CR(P)-654 ..... N75-29095 #
ESRO-CR(P)-656 ..... N75-29452 #

ESRO-ESTL-10 ..... N75-29095 #
ESRO-ESTL-11 ..... N75-29451 #

ESRO-SP-85 ..... N75-29689 #

ESRO-TN-116-ESTEC ..... N75-29158 #

ESRO-TT-144 ..... N75-29988 #

ESS/SS-617 ..... N75-29146 #

ETL-CR-74-20 ..... N75-29543 #

E75-10361 ..... N75-29503*#
E75-10362 ..... N75-29504*#
E75-10363 ..... N75-29505*#
E75-10364 ..... N75-29506*#
E75-10365 ..... N75-29507*#
E75-10366 ..... N75-29508*#
E75-10367 ..... N75-29509*#
E75-10368 ..... N75-29510*#
E75-10369 ..... N75-29511*#
E75-10370 ..... N75-29512*#
E75-10371 ..... N75-29513*#
E75-10372 ..... N75-29514*#
E75-10373 ..... N75-29515*#
E75-10374 ..... N75-29516*#
E75-10375 ..... N75-29517*#
E75-10376 ..... N75-29518*#
E75-10377 ..... N75-29519*#
E75-10378 ..... N75-29520*#
E75-10379 ..... N75-29521*#
E75-10380 ..... N75-29522*#
E75-10381 ..... N75-29523*#
E75-10382 ..... N75-29524*#
E75-10383 ..... N75-29525*#
E75-10384 ..... N75-29526*#

FA-WA-74-60 ..... N75-29319 #

FAA-EM-73-8-ADD-1 ..... N75-29064 #
FAA-EM-74-2-REV-1 ..... N75-29068 #
FAA-EM-74-16 ..... N75-29154 +
FAA-EM-75-4 ..... N75-29063 #
FAA-EM-75-6 ..... N75-29065 #

FAA-NA-74-1 ..... N75-29285 #
FAA-NA-74-14 ..... N75-29286 #
FAA-NA-74-35 ..... N75-29074 #
FAA-NA-74-58 ..... N75-29080 #
FAA-NA-74-169 ..... N75-29288 #

FAA-RD-73-197 ..... N75-29134 #
FAA-RD-73-198-3 ..... N75-29472 #
FAA-RD-74-43 ..... N75-29073 #
FAA-RD-74-140 ..... N75-29286 #
FAA-RD-74-144 ..... N75-29287 #
FAA-RD-74-145 ..... N75-29079 #
FAA-RD-74-165-2 ..... N75-29081 #
FAA-RD-74-185 ..... N75-29075 #
FAA-RD-74-186 ..... N75-29078 #
FAA-RD-74-198 ..... N75-29074 #
FAA-RD-74-203 ..... N75-29083 #
FAA-RD-74-209 ..... N75-29076 #

FAA-RD-74-212 ..... N75-29572 #
FAA-RD-75-2 ..... N75-29730 #
FAA-RD-75-11 ..... N75-29077 #
FAA-RD-75-27 ..... N75-29080 #
FAA-RD-75-28 ..... N75-29288 #
FAA-RD-75-43 ..... N75-29062 #
FAA-RD-75-44 ..... N75-29090 #
FAA-RD-75-46 ..... N75-29061 #
FAA-RD-75-48 ..... N75-29133 #
FAA-RD-75-50 ..... N75-29136 #
FAA-RD-75-63 ..... N75-29319 #
FAA-RD-75-68 ..... N75-29113 #
FAA-RD-75-69 ..... N75-29636 #
FAA-RD-75-70 ..... N75-29131 #

FEA/EI-50068 ..... N75-29953 #

FOA-B-20002-E1 ..... N75-29862 #
FOA-B-30003-A3 ..... N75-29913 #
FOA-B-40018-B6 ..... N75-29182 #

FR-75-14-89 ..... N75-29335 #
FR-950/1 ..... N75-29211*#
FR-6924 ..... N75-29248*#

FRA-ORD/D-75-28 ..... N75-29957 #

FSTC-HT-23-91-74 ..... N75-29342 #
FSTC-HT-23-131-74 ..... N75-29344 #
FSTC-HT-23-173-75 ..... N75-29568 #
FSTC-HT-23-177-75 ..... N75-29922 #
FSTC-HT-23-179-75 ..... N75-29921 #
FSTC-HT-23-326-75 ..... N75-29444 #
FSTC-HT-23-366-74 ..... N75-29928 #
FSTC-HT-23-385-74 ..... N75-29332 #
FSTC-HT-23-419-74 ..... N75-29927 #
FSTC-HT-23-707-74 ..... N75-29889 #
FSTC-HT-23-845-74 ..... N75-29499 #
FSTC-HT-23-883-74 ..... N75-29421 #
FSTC-HT-23-930-74 ..... N75-29563 #
FSTC-HT-23-935-74 ..... N75-29923 #
FSTC-HT-23-953-74 ..... N75-29333 #
FSTC-HT-23-964-73 ..... N75-29439 #
FSTC-HT-23-0040-75 ..... N75-29258 #
FSTC-HT-23-0119-75 ..... N75-29255 #
FSTC-HT-23-0361-74 ..... N75-29697 #
FSTC-HT-23-0386-74 ..... N75-29893 #
FSTC-HT-23-0407-74 ..... N75-29151 #
FSTC-HT-23-0425-74 ..... N75-29929 #
FSTC-HT-23-0426-74 ..... N75-29343 #
FSTC-HT-23-0764-74 ..... N75-29788 #
FSTC-HT-23-0826-73 ..... N75-29393 #
FSTC-HT-23-0897-74 ..... N75-29445 #
FSTC-HT-23-1000-74 ..... N75-29565 #
FSTC-HT-23-1052-73 ..... N75-29874 #
FSTC-HT-23-1062-72 ..... N75-29394 #
FSTC-HT-23-1135-73 ..... N75-29438 #
FSTC-HT-23-1146-73 ..... N75-29220 #
FSTC-HT-23-1574-71 ..... N75-29566 #
FSTC-HT-23-1576-71 ..... N75-29564 #
FSTC-HT-23-1639-73 ..... N75-29371 #
FSTC-HT-23-1641-73 ..... N75-29372 #

FTD-BC-23-2564-74 ..... N75-29336 #

FTD-HT-24-1907-74 ..... N75-29228 #
FTD-HT-24-1916-74 ..... N75-29229 #
FTD-HT-24-1924-74 ..... N75-29230 #
FTD-HT-24-1931-74 ..... N75-29225 #
FTD-HT-24-1934-74 ..... N75-29222 #
FTD-HT-24-1951-74 ..... N75-29224 #
FTD-HT-24-2000-74 ..... N75-29231 #
FTD-HT-24-2004-74 ..... N75-29184 #
FTD-HT-24-2029-74 ..... N75-29223 #
FTD-HT-24-2630-74 ..... N75-29098 #
FTD-HT-24-2755-74 ..... N75-29256 #

G-072 ..... N75-29524*#
G-7550 ..... N75-29857*#

GATE-14-VOL-2 ..... N75-29639 #

GER-16164 ..... N75-29543 #

GSA/OP/HCL-TR-96 ..... N75-29952 #

GSH/SH/74D-10 ..... N75-29280 #

GWPS-OP-17 ..... N75-29949 #

H-W-PUB-18 ..... N75-29542 #

HAC-P74-541 ..... N75-29770 #

HDL-TR-1685 ..... N75-29873 #

HH-74-141 ..... N75-29462 #

HHA-14 ..... N75-29113 #

IBM-75W-00041 ..... N75-29174*#

IC-AERO-74-09 ..... N75-29793 #

ICSA-275-025-014 ..... N75-29821*#

IES-22 ..... N75-29690 #
IES-27 ..... N75-29691 #
IES-29 ..... N75-29692 #
IES-30 ..... N75-29693 #

IFD-5/73 ..... N75-29035*#

IGPP-UCR-75-1 ..... N75-29984 #

IM-5 ..... N75-29252 #

ISAS-528-VOL-40-NO-8 ..... N75-29408 #
ISAS-529-VOL-40-NO-9 ..... N75-29477 #
ISAS-530-VOL-40-NO-10 ..... N75-29871 #

ISBN-0-309-02248-7 ..... N75-29595 #
ISBN-0-309-02359-9 ..... N75-29191 #
ISBN-0-7065-1496-3 ..... N75-29213 #
ISBN-91-7056-032-3 ..... N75-29913 #
ISBN-91-7056-034-X ..... N75-29182 #
ISBN-92-63-10299-6 ..... N75-29574 #
ISBN-97-7056-031-5 ..... N75-29862 #

ISD-161 ..... N75-29251 #
ISD-162 ..... N75-29486 #

ISR-1 ..... N75-29903 #

ISS-L-74/2 ..... N75-29911 #
ISS-L-74/8 ..... N75-29861 #

ISS-P-75/4 ..... N75-29912 #

ISS-T-74/6 ..... N75-29941 #

ISSN-0077-5541 ..... N75-29033*#

ISU-ERI-AMES-74276 ..... N75-29218 #
ISU-ERI-AMES-75169 ..... N75-29038*#

ITR-7 ..... N75-29580 #

IZF-1974-20-PT-1 ..... N75-29760 #
IZF-1974-28 ..... N75-29761 #
IZF-1974-29-PT-1 ..... N75-29762 #
IZF-1974-30-PT-2 ..... N75-29763 #

JHU-EE-74-11 ..... N75-29814 #

JPL-PR-42-28 ..... N75-29289*#

JPRS-65331 ..... N75-29295 #

JSC-09063 ..... N75-29602*#
JSC-09389-VOL-6 ..... N75-29536*#
JSC-09492 ..... N75-29088*#
JSC-09655 ..... N75-29293*#
JSC-09709 ..... N75-29773*#
JSC-09781 ..... N75-29145*#

JTCG/AS-74-V-009 ..... N75-29101 #

L-9531 ..... N75-29037*#
L-9847 ..... N75-29156*#
L-9889 ..... N75-29965*#
L-10026 ..... N75-29039*#
L-10070 ..... N75-29153*#
L-10072 ..... N75-29365*#
L-10142 ..... N75-29001*#

LARS-IN-022175 ..... N75-29530*#
LARS-IN-051975 ..... N75-29529*#

LARS-IN-112674 ..... N75-29534*#

LARS-INFORM-NOTE-090174 ..... N75-29528*#

LC-74-28136 ..... N75-29492 #
LC-75-600023 ..... N75-29001*#

LEC-5748 ..... N75-29942*#
LEC-6025A ..... N75-29293*#
LEC-6329 ..... N75-29943*#
LEC-6408 ..... N75-29145*#
LEC-60907 ..... N75-29137*#

LMSCI-D409290 ..... N75-29341 #

LR-586 ..... N75-29033*#

LRBA-E-602-NT-26/SIE ..... N75-29437 #

LRP-87/74 ..... N75-29823 #
LRP-90/75 ..... N75-29824 #

LSI-ER-195-7 ..... N75-29436*#

LUIP-CR-74-13 ..... N75-29987 #

MAC-TM-60 ..... N75-29798 #

MAN-1010 ..... N75-29090 #

MBB-UR-V-77-74 ..... N75-29975 #

MBL-1974-37 ..... N75-29744 #

MDC-E-1246 ..... N75-29132*#

MDC-E1198 ..... N75-29135*#
MDC-E1234 ..... N75-29088*#
MDC-E1249-VOL-1 ..... N75-29407*#

MDC-G5979 ..... N75-29278*#

MDC-J6891 ..... N75-29093*#

MIRM-74-11-REV ..... N75-29558 #

MRC-W-110 ..... N75-29866 #

MRC-TSR-1343 ..... N75-29827 #
MRC-TSR-1463 ..... N75-29826 #
MRC-TSR-1484 ..... N75-29828 #
MRC-TSR-1514 ..... N75-29825 #

MSC-2225 ..... N75-29345 #
MSC-05537 ..... N75-29531*#
MSC-05543 ..... N75-29532*#

MTI-74TR21 ..... N75-29443 #

MTR-2677-VOL-10 ..... N75-29808 #
MTR-2815 ..... N75-29309 #
MTR-4243-VOL-2 ..... N75-29081 #
MTR-6334-SUPPL-1 ..... N75-29064 #
MTR-6528-REV-1 ..... N75-29068 #
MTR-6609 ..... N75-29154 #
MTR-6676 ..... N75-29073 #
MTR-6852 ..... N75-29065 #

NA-72-803 ..... N75-29089*#

NAL-TR-376 ..... N75-29105 #
NAL-TR-378T ..... N75-29354 #
NAL-TR-379T ..... N75-29355 #
NAL-TR-388T ..... N75-29471 #
NAL-TR-389 ..... N75-29122 #
NAL-TR-391 ..... N75-29792 #
NAL-TR-392T ..... N75-29350 #
NAL-TR-394 ..... N75-29212 #
NAL-TR-395 ..... N75-29177 #
NAL-TR-396 ..... N75-29026 #
NAL-TR-398 ..... N75-29176 #
NAL-TR-399 ..... N75-29027 #
NAL-TR-401 ..... N75-29475 #
NAL-TR-403 ..... N75-29476 #
NAL-TR-404T ..... N75-29032 #
NAL-TR-408 ..... N75-29789 #
NAL-TR-409 ..... N75-29178 #

NAMRL-1195 ..... N75-29756 #

NASA-CASE-ARC-10266-1 ..... N75-29318*
NASA-CASE-ARC-10711-2 ..... N75-29320*#
NASA-CASE-ARC-10806-1 ..... N75-29381*

NASA-CASE-FRC-10081-1 ..... N75-29432*#

NASA-CASE-GSC-11883-1 ..... N75-29430*#
NASA-CASE-GSC-11974-1 ..... N75-29430*#
NASA-CASE-GSC-11975-1 ..... N75-29430*#

NASA-CASE-HQN-10462 ..... N75-29192*

NASA-CASE-LAR-10805-2 ..... N75-29431*#
NASA-CASE-LAR-11397-1 ..... N75-29263*#
NASA-CASE-LAR-11828-1 ..... N75-29181*#

NASA-CASE-MFS-21628-2 ..... N75-29548*#
NASA-CASE-MFS-22060-1 ..... N75-29380*
NASA-CASE-MFS-23088-1 ..... N75-29160*#
NASA-CASE-MFS-23167-1 ..... N75-29547*#

NASA-CASE-NPO-13459-1 ..... N75-29277*#
NASA-CASE-NPO-13683-1 ..... N75-29383*#

NASA-CASE-XLE-10717 ..... N75-29426*

NASA-CASE-XNS-05731 ..... N75-29382*

NASA-CASE-XNP-01311 ..... N75-29236*

NASA-CR-120664 ..... N75-29170*#
NASA-CR-120671 ..... N75-29174*#
NASA-CR-120672 ..... N75-29818*#
NASA-CR-120673 ..... N75-29247*#
NASA-CR-120684 ..... N75-29388*#
NASA-CR-120685 ..... N75-29986*#
NASA-CR-120687 ..... N75-29962*#
NASA-CR-132681 ..... N75-29089*#
NASA-CR-132686 ..... N75-29031*#
NASA-CR-132692 ..... N75-29130*#
NASA-CR-132695 ..... N75-29359*#
NASA-CR-132696 ..... N75-29360*#
NASA-CR-132697 ..... N75-29361*#
NASA-CR-132703 ..... N75-29093*#
NASA-CR-132711 ..... N75-29127*#
NASA-CR-132713 ..... N75-29066*#
NASA-CR-134709 ..... N75-29117*#
NASA-CR-134758 ..... N75-29449*#
NASA-CR-134780 ..... N75-29433*#
NASA-CR-134787 ..... N75-29109*#
NASA-CR-134806 ..... N75-29238*#
NASA-CR-134810 ..... N75-29278*#
NASA-CR-134821 ..... N75-29910*#
NASA-CR-134824 ..... N75-29248*#
NASA-CR-134844 ..... N75-29175*#
NASA-CR-137547 ..... N75-29351*#
NASA-CR-137665 ..... N75-29121*#
NASA-CR-137688 ..... N75-29436*#
NASA-CR-137708 ..... N75-29294*#
NASA-CR-137717 ..... N75-29030*#
NASA-CR-141400 ..... N75-29706*#
NASA-CR-141534 ..... N75-29165*#
NASA-CR-141549 ..... N75-29163*#
NASA-CR-141861 ..... N75-29530*#
NASA-CR-141911 ..... N75-29531*#
NASA-CR-141912 ..... N75-29532*#
NASA-CR-141918 ..... N75-29521*#
NASA-CR-141930 ..... N75-29528*#
NASA-CR-141931 ..... N75-29529*#
NASA-CR-141936 ..... N75-29908*#
NASA-CR-143052 ..... N75-29959*#
NASA-CR-143219 ..... N75-29503*#
NASA-CR-143220 ..... N75-29504*#
NASA-CR-143221 ..... N75-29505*#
NASA-CR-143222 ..... N75-29506*#
NASA-CR-143223 ..... N75-29507*#
NASA-CR-143224 ..... N75-29508*#
NASA-CR-143225 ..... N75-29509*#
NASA-CR-143226 ..... N75-29510*#
NASA-CR-143227 ..... N75-29511*#
NASA-CR-143228 ..... N75-29512*#
NASA-CR-143229 ..... N75-29513*#
NASA-CR-143230 ..... N75-29514*#
NASA-CR-143232 ..... N75-29515*#
NASA-CR-143233 ..... N75-29516*#
NASA-CR-143234 ..... N75-29517*#
NASA-CR-143238 ..... N75-29518*#
NASA-CR-143239 ..... N75-29519*#
NASA-CR-143240 ..... N75-29520*#
NASA-CR-143242 ..... N75-29522*#
NASA-CR-143243 ..... N75-29523*#
NASA-CR-143244 ..... N75-29524*#
NASA-CR-143245 ..... N75-29525*#
NASA-CR-143246 ..... N75-29526*#
NASA-CR-143254 ..... N75-29907*#
NASA-CR-143266 ..... N75-29603*#
NASA-CR-143267 ..... N75-29604*#
NASA-CR-143268 ..... N75-29937*#
NASA-CR-143269 ..... N75-29605*#
NASA-CR-143270 ..... N75-29977*#
NASA-CR-143271 ..... N75-29914*#
NASA-CR-143272 ..... N75-29969*#
NASA-CR-143273 ..... N75-29958*#
NASA-CR-143284 ..... N75-29985*#
NASA-CR-143285 ..... N75-29974*#
NASA-CR-143286 ..... N75-29894*#
NASA-CR-143287 ..... N75-29474*#
NASA-CR-143288 ..... N75-29386*#
NASA-CR-143289 ..... N75-29289*#
NASA-CR-143290 ..... N75-29976*#
NASA-CR-143301 ..... N75-29978*#
NASA-CR-143311 ..... N75-29743*#
NASA-CR-143312 ..... N75-29038*#
NASA-CR-143313 ..... N75-29249*#
NASA-CR-143314 ..... N75-29115*#
NASA-CR-143315 ..... N75-29535*#
NASA-CR-143316 ..... N75-29963*#
NASA-CR-143317 ..... N75-29527*#
NASA-CR-143350 ..... N75-29211*#
NASA-CR-143811 ..... N75-29916*#
NASA-CR-143813 ..... N75-29291*#
NASA-CR-143827 ..... N75-29961*#
NASA-CR-143828 ..... N75-29887*#
NASA-CR-143829 ..... N75-29944*#
NASA-CR-143832 ..... N75-29290*#
NASA-CR-143833 ..... N75-29299*#
NASA-CR-143834 ..... N75-29162*#
NASA-CR-144356 ..... N75-29132*#
NASA-CR-144357 ..... N75-29088*#
NASA-CR-144358 ..... N75-29943*#
NASA-CR-144361 ..... N75-29740*#
NASA-CR-144362 ..... N75-29264*#
NASA-CR-144364 ..... N75-29356*#
NASA-CR-144365 ..... N75-29186*#
NASA-CR-144366 ..... N75-29778*#
NASA-CR-144367 ..... N75-29779*#
NASA-CR-144368 ..... N75-29942*#
NASA-CR-144369 ..... N75-29293*#
NASA-CR-144370 ..... N75-29137*#
NASA-CR-144371 ..... N75-29145*#
NASA-CR-144374 ..... N75-29536*#
NASA-CR-144375 ..... N75-29407*#
NASA-CR-144376 ..... N75-29135*#
NASA-CR-144377 ..... N75-29820*#
NASA-CR-144378 ..... N75-29169*#
NASA-CR-144379 ..... N75-29534*#
NASA-CR-144382 ..... N75-29216*#
NASA-CR-144385 ..... N75-29821*#
NASA-CR-144386 ..... N75-29166*#
NASA-CR-144655 ..... N75-29410*#
NASA-CR-144656 ..... N75-29164*#
NASA-CR-144658 ..... N75-29161*#
NASA-CR-144659 ..... N75-29389*#
NASA-CR-144660 ..... N75-29964*#
NASA-CR-144662 ..... N75-29362*#

NASA-SP-371 ..... N75-29845*#
NASA-SP-372 ..... N75-29001*#
NASA-SP-373 ..... N75-29960*#
NASA-SP-7011(142) ..... N75-29735*+

NASA-TM-X-3184 ..... N75-29156*#
NASA-TM-X-3262 ..... N75-29118*#
NASA-TM-X-3265 ..... N75-29187*#
NASA-TM-X-3266 ..... N75-29638*#
NASA-TM-X-58137 ..... N75-29602*#
NASA-TM-X-62434 ..... N75-29067*#
NASA-TM-X-62456 ..... N75-29915*#
NASA-TM-X-62465 ..... N75-29384*#
NASA-TM-X-64950 ..... N75-29819*#
NASA-TM-X-64951 ..... N75-29387*#
NASA-TM-X-71678 ..... N75-29429*#
NASA-TM-X-71734 ..... N75-29240*#
NASA-TM-X-71751 ..... N75-29242*#
NASA-TM-X-71758 ..... N75-29546*#
NASA-TM-X-71764 ..... N75-29108*#
NASA-TM-X-71765 ..... N75-29243*#

NASA-TM-X-71767 ..... N75-29353*#
NASA-TM-X-71769 ..... N75-29241*#
NASA-TM-X-71770 ..... N75-29155*#
NASA-TM-X-71772 ..... N75-29473*#
NASA-TM-X-71773 ..... N75-29284*#
NASA-TM-X-71775 ..... N75-29172*#
NASA-TM-X-71776 ..... N75-29110*#
NASA-TM-X-71777 ..... N75-29107*#
NASA-TM-X-71778 ..... N75-29106*#
NASA-TM-X-71779 ..... N75-29128*#
NASA-TM-X-71781 ..... N75-29909*#
NASA-TM-X-71783 ..... N75-29173*#
NASA-TM-X-72447 ..... N75-29773*#
NASA-TM-X-72448 ..... N75-29033*#
NASA-TM-X-72691 ..... N75-29774*#
NASA-TM-X-72713 ..... N75-29188*#
NASA-TM-X-72745 ..... N75-29091*#
NASA-TM-X-72748 ..... N75-29036*#
NASA-TM-X-72754 ..... N75-29092*#
NASA-TM-X-72759 ..... N75-29116*#
NASA-TM-X-72760 ..... N75-29119*#

NASA-TM-D-7889 ..... N75-29965*#
NASA-TM-D-7923 ..... N75-29037*#
NASA-TM-D-7963 ..... N75-29153*#
NASA-TM-D-7999 ..... N75-29365*#
NASA-TM-D-8019 ..... N75-29039*#
NASA-TM-D-8029 ..... N75-29434*#
NASA-TM-D-8030 ..... N75-29435*#
NASA-TM-D-8032 ..... N75-29896*#
NASA-TM-D-8047 ..... N75-29857*#
NASA-TM-D-8048 ..... N75-29250*#

NASA-TT-F-15570 ..... N75-29970*#
NASA-TT-F-15571 ..... N75-29141*#
NASA-TT-F-16262 ..... N75-29126*#
NASA-TT-F-16296 ..... N75-29971*#
NASA-TT-F-16321 ..... N75-29719*#
NASA-TT-F-16367 ..... N75-29120*#
NASA-TT-F-16373 ..... N75-29895*#
NASA-TT-F-16376 ..... N75-29142*#
NASA-TT-F-16380 ..... N75-29635*#
NASA-TT-F-16419 ..... N75-29143*#
NASA-TT-F-16423 ..... N75-29087*#
NASA-TT-F-16435 ..... N75-29533*#
NASA-TT-F-16439 ..... N75-29262*#
NASA-TT-F-16448 ..... N75-29739*#
NASA-TT-F-16452 ..... N75-29237*#
NASA-TT-F-16455 ..... N75-29606*#
NASA-TT-F-16457 ..... N75-29777*#
NASA-TT-F-16460 ..... N75-29968*#
NASA-TT-F-16465 ..... N75-29772*#
NASA-TT-F-16466 ..... N75-29140*#
NASA-TT-F-16467 ..... N75-29720*#
NASA-TT-F-16470 ..... N75-29741*#
NASA-TT-F-16471 ..... N75-29742*#
NASA-TT-F-16473 ..... N75-29171*#
NASA-TT-F-16474 ..... N75-29246*#
NASA-TT-F-16475 ..... N75-29776*#
NASA-TT-F-16476 ..... N75-29352*#
NASA-TT-F-16477 ..... N75-29239*#
NASA-TT-F-16478 ..... N75-29718*#
NASA-TT-F-16479 ..... N75-29292*#
NASA-TT-F-16480 ..... N75-29385*#
NASA-TT-F-16482 ..... N75-29780*#
NASA-TT-F-16483 ..... N75-29721*#
NASA-TT-F-16487 ..... N75-29979*#
NASA-TT-F-16488 ..... N75-29980*#
NASA-TT-F-16490 ..... N75-29035*#
NASA-TT-F-16491 ..... N75-29214*#
NASA-TT-F-16493 ..... N75-29757*#
NASA-TT-F-16495 ..... N75-29856*#
NASA-TT-F-16496 ..... N75-29731*#
NASA-TT-F-16498 ..... N75-29775*#
NASA-TT-F-16499 ..... N75-29758*#
NASA-TT-F-16503 ..... N75-29732*#
NASA-TT-F-16506 ..... N75-29357*#
NASA-TT-F-16507 ..... N75-29358*#
NASA-TT-F-16509 ..... N75-29245*#
NASA-TT-F-16511 ..... N75-29215*#
NASA-TT-F-16516 ..... N75-29144*#

NBS-BSS-61 ..... N75-29492 #

NBS-SP-400-8 ..... N75-29329 #

NBSIR-75-804 ..... N75-29404 #

NEAR-TR-60 ..... N75-29071 #

NGR-43-008-008 ..... N75-29112*#

NGTE-NT-833 ..... N75-29484 #

NGTE-321 ..... N75-29049 #

NIMS-3 ..... N75-29856*#

NIOSH-TR-75-01-VOL-1 ..... N75-29785 #
NIOSH-TR-75-01-VOL-2 ..... N75-29786 #

NLR-TR-74005-U ..... N75-29490 #
NLR-TR-74032-U ..... N75-29487 #
NLR-TR-74033-U ..... N75-29488 #
NLR-TR-74048-U ..... N75-29252 #
NLR-TR-74094-U ..... N75-29253 #
NLR-TR-74125-U ..... N75-29056 #
NLR-TR-75033-C ..... N75-29452 #

NMRC-KP-133 ..... N75-29270 #

NMSU-APOSR-TR-74-3 ..... N75-29769 #

NMSU-EES-244-72 ..... N75-29810 #

NOAA-TM-NESS-62 ..... N75-29698 #

NOAA-TR-ERL-313-WMPO-5 ..... N75-29700 #

NOAA-TR-NESS-72 ..... N75-29616 #

NOAA-75022604 ..... N75-29694 #
NOAA-75030504 ..... N75-29695 #
NOAA-75030505 ..... N75-29696 #
NOAA-75032014 ..... N75-29616 #
NOAA-75032408 ..... N75-29712 #
NOAA-75040201 ..... N75-29700 #
NOAA-75040304 ..... N75-29699 #
NOAA-75040305 ..... N75-29593 #
NOAA-75040401 ..... N75-29540 #

NOLTR-74-182 ..... N75-29373 #

NPL-COM-72 ..... N75-29305 #
NPL-COM-73 ..... N75-29745 #

NPL-NAC-59 ..... N75-29794 #

NPS-52AB74124 ..... N75-29339 #

NRC-14756 ..... N75-29364 #
NRC-14765 ..... N75-29033*#

NRL-MR-2861 ..... N75-29902 #
NRL-MR-2979 ..... N75-29316 #
NRL-MR-2984 ..... N75-29422 #
NRL-MR-2985 ..... N75-29716 #

NRL-7833 ..... N75-29315 #
NRL-7835 ..... N75-29556 #

NSCG-D-48-75-VOL-01 ..... N75-29082 #

NSF/RA/E-74-027 ..... N75-29587 #
NSF/RA/E-74-036 ..... N75-29423 #
NSF/RA/E-74-053 ..... N75-29690 #
NSF/RA/E-74-055 ..... N75-29692 #
NSF/RA/G-74-006 ..... N75-29588 #
NSF/RA/G-74-018 ..... N75-29570 #
NSF/RA/G-74-028 ..... N75-29552 #
NSF/RA/W-74-166 ..... N75-29269 #
NSF/RANW/IT/GI-34990/PR-74-5 ..... N75-29423 #

NSRDC-3150 ..... N75-29442 #
NSRDC-4493 ..... N75-29261 #
NSRDC-4517 ..... N75-29399 #

NULTST-1 ..... N75-29386*#

NUREG-75/033 ..... N75-29551 #
NUREG-75/034 ..... N75-29883 #
NUREG-75/036 ..... N75-29882 #
NUREG-75/037 ..... N75-29884 #
NUREG-75/038 ..... N75-29956 #

NWC-TP-5714 ..... N75-29837 #

OAD-CR-73-VOL-1 ..... N75-29806 #
OAD-CR-73-VOL-2 ..... N75-29807 #
OAD-CR-73-VOL-3 ..... N75-29808 #

ONRL-R-1-75 ..... N75-29924 #

ORI-TR-870-VOL-01 ..... N75-29082 #

ORSER-SSEL-TR-4-75 ..... N75-29504*#
ORSER-SSEL-TR-19-74 ..... N75-29510*#

OSU-CISRC-TR-74-7-PT-2 ..... N75-29803 #

OUEL-1102/74-PT-1 ..... N75-29864 #
OUEL-1103/74-PT-2 ..... N75-29865 #
OUEL-1110/74 ..... N75-29279 #

OWRT-A-045-NY(2) ..... N75-29544 #
OWRT-A-048-NEV(1) ..... N75-29542 #

OWRT-B-067-ILL(2) ..... N75-29586 #

PAPER-B-4 ..... N75-29371 #
PAPER-B-11 ..... N75-29372 #

PAPER-6 ..... N75-29427

PB-239790/9 ..... N75-29586 #
PB-240012/5 ..... N75-29269 #
PB-240261/8 ..... N75-29254 #
PB-240328/5 ..... N75-29495 #
PB-240367/3 ..... N75-29500 #
PB-240418/4 ..... N75-29953 #
PB-240495/2 ..... N75-29798 #
PB-240553/8 ..... N75-29570 #
PB-240681/7 ..... N75-29545 #
PB-240699/9 ..... N75-29587 #
PB-240739/2 ..... N75-29600 #
PB-240761/7 ..... N75-29588 #
PB-240784/9 ..... N75-29552 #
PB-240813/6 ..... N75-29542 #
PB-240818/5 ..... N75-29949 #
PB-240843/3 ..... N75-29379 #
PB-240849/0 ..... N75-29614 #
PB-240853/2 ..... N75-29575 #
PB-240859/9 ..... N75-29576 #
PB-240862/3 ..... N75-29577 #
PB-240863/1 ..... N75-29578 #
PB-240870/6 ..... N75-29690 #
PB-240872/2 ..... N75-29691 #
PB-240873/0 ..... N75-29692 #
PB-240874/8 ..... N75-29693 #
PB-240916/7 ..... N75-29595 #
PB-240920/9 ..... N75-29783 #
PB-240950/6 ..... N75-29317 #
PB-240957/1 ..... N75-29191 #
PB-240979/5 ..... N75-29591 #
PB-240986/0 ..... N75-29599 #
PB-240994/4 ..... N75-29957 #
PB-240995/1 ..... N75-29589 #
PB-241018/1 ..... N75-29579 #
PB-241021/5 ..... N75-29597 #
PB-241022/3 ..... N75-29594 #
PB-241030/6 ..... N75-29423 #
PB-241047/0 ..... N75-29447 #
PB-241048/8 ..... N75-29271 #
PB-241064/5 ..... N75-29584 #
PB-241065/2 ..... N75-29956 #
PB-241071/0 ..... N75-29502 #
PB-241080/1 ..... N75-29590 #
PB-241081/9 ..... N75-29585 #
PB-241083 ..... N75-29955 #
PB-241086/8 ..... N75-29403 #
PB-241093/4 ..... N75-29584 #
PB-241095/9 ..... N75-29559 #
PB-241096/7 ..... N75-29560 #
PB-241097/5 ..... N75-29561 #
PB-241098/3 ..... N75-29562 #
PB-241105/6 ..... N75-29787 #
PB-241108/0 ..... N75-29883 #
PB-241113/0 ..... N75-29952 #
PB-241121/3 ..... N75-29784 #
PB-241141/1 ..... N75-29596 #
PB-241142/9 ..... N75-29810 #
PB-241143/7 ..... N75-29541 #
PB-241155/1 ..... N75-29378 #
PB-241159/3 ..... N75-29617 #
PB-241165/0 ..... N75-29551 #
PB-241167/6 ..... N75-29785 #
PB-241168/4 ..... N75-29786 #
PB-241204/7 ..... N75-29592 #
PB-241223/7 ..... N75-29086 #
PB-241245/0 ..... N75-29219 #
PB-241246/8 ..... N75-29747 #
PB-241248/4 ..... N75-29598 #
PB-241266/6 ..... N75-29882 #
PB-241456/3 ..... N75-29884 #

PC-NAS-003 ..... N75-29914*#

PGE-2007 ..... N75-29502 #

PHL-1974-31 ..... N75-29321 #
PHL-1974-32 ..... N75-29688 #
PHL-1974-33 ..... N75-29322 #
PHL-1974-38 ..... N75-29323 #
PHL-1975-01 ..... N75-29324 #

PMT-B4-R74-1 ..... N75-29957 #

PPG-194 ..... N75-29900 #

PR-1 ..... N75-29520*#
PR-202 ..... N75-29971*#

PRC-R-1706-VOL-1 ..... N75-29537 #
PRC-R-1706-VOL-2 ..... N75-29538 #
PRC-R-1706-VOL-3 ..... N75-29539 #

PSU-IRL-SCI-434 ..... N75-29603*#

QPR-2 ..... N75-29506*#
QPR-4 ..... N75-29623 #
QPR-7 ..... N75-29327 #

QR-3 ..... N75-29164*#
QR-4 ..... N75-29161*#

QTR-1 ..... N75-29890 #

R-9196 ..... N75-29216*#

RADC-TR-74-245-VOL-1 ..... N75-29537 #
RADC-TR-74-245-VOL-2 ..... N75-29538 #
RADC-TR-74-245-VOL-3 ..... N75-29539 #
RADC-TR-75-47 ..... N75-29890 #

RAE-TH-IR-148 ..... N75-29391 #

RAE-TR-72171 ..... N75-29052 #
RAE-TR-73011 ..... N75-29094 #
RAE-TR-73090 ..... N75-29047 #
RAE-TR-73091 ..... N75-29043 #
RAE-TR-73092 ..... N75-29046 #
RAE-TR-73094 ..... N75-29041 #
RAE-TR-73097 ..... N75-29048 #
RAE-TR-73123 ..... N75-29392 #
RAE-TR-73168 ..... N75-29054 #
RAE-TR-73174 ..... N75-29483 #
RAE-TR-74042 ..... N75-29485 #
RAE-TR-74054 ..... N75-29051 #
RAE-TR-74090 ..... N75-29050 #
RAE-TR-74091 ..... N75-29147 #
RAE-TR-74107 ..... N75-29148 #
RAE-TR-74110 ..... N75-29149 #
RAE-TR-74112 ..... N75-29157 #
RAE-TR-74158 ..... N75-29781 #
RAE-TR-74164 ..... N75-29150 #
RAE-TR-74166 ..... N75-29782 #

RCA/TELTA-TR-73-030 ..... N75-29058 #
RCA/TELTA-TR-73-031 ..... N75-29060 #
RCA/TELTA-TR-73-033 ..... N75-29189 #
RCA/TELTA-TR-74-050 ..... N75-29059 #

RD/B/N-3157 ..... N75-29217 #

RDR-1780-2 ..... N75-29123 #

REPT-1-75-2 ..... N75-29447 #
REPT-4-17 ..... N75-29363 #
REPT-8/1974 ..... N75-29872 #
REPT-18 ..... N75-29605*#
REPT-19 ..... N75-29985*#
REPT-74-1-ONR ..... N75-29375 #
REPT-74-19 ..... N75-29715 #
REPT-74-87 ..... N75-29589 #

REPT-74/66M-21 ..... N75-29084 #
REPT-75-9C4-SIWEB-R1 ..... N75-29910*#
REPT-75-9C31-CRYEL-R1 ..... N75-29337 #
REPT-75-04 ..... N75-29162*#
REPT-75-007 ..... N75-29959*#
REPT-156 ..... N75-29869 #
REPT-182 ..... N75-29409 #
REPT-251-CA/53 ..... N75-29167 #
REPT-828-CA/40 ..... N75-29168 #
REPT-1016 ..... N75-29790 #
REPT-1974-3 ..... N75-29967 #
REPT-2265.30/462 ..... N75-29291*#
REPT-7204-412011 ..... N75-29459 #

RIP20233 ..... N75-29717 #

RK-CR-75-22 ..... N75-29418 #

RR-160/DNS/MBR/2 ..... N75-29842 #
RR-162/MBR/1 ..... N75-29840 #
RR-164/PSC/3 ..... N75-29841 #
RR-166/GAB/IRD/1 ..... N75-29850 #
RR-168/PSC/4 ..... N75-29843 #

RRE-TN-783 ..... N75-29300 #

R74EHH15 ..... N75-29331 #
R74EHH20 ..... N75-29455 #
R9616 ..... N75-29418 #

S-74-74-8-VOL-3 ..... N75-29472 #

S/T-MEMO-9/74 ..... N75-29482 #

SAI-74-001-AA ..... N75-29608 #
SAI-76-558-HU ..... N75-29818*#

SAH-TR-74-51 ..... N75-29755 #
SAH-TR-74-52 ..... N75-29753 #
SAH-TR-74-63 ..... N75-29746 #
SAH-TR-75-1 ..... N75-29754 #
SAH-TR-75-4 ..... N75-29397 #

SAHSO-TR-74-153 ..... N75-29402 #
SAHSO-TR-75-17 ..... N75-29892 #

SAND-74-0344 ..... N75-29183 #

SAPR-3 ..... N75-29514*#

SAR-2 ..... N75-29337 #
SAR-2/3 ..... N75-29234 #
SAR-5 ..... N75-29249*#

SASR-25 ..... N75-29977*#

SATR-3 ..... N75-29622 #

SCG-40365R ..... N75-29567 #
SCG-50150R ..... N75-29164*#

SCI-2040-4 ..... N75-29062 #

SC510.6FR ..... N75-29934 #
SC529.3FR ..... N75-29933 #

SDC-TM-5478/000/00 ..... N75-29813 #

SER-149 ..... N75-29500 #
SER-405 ..... N75-29254 #

SHEPPARD-PR-74-4 ..... N75-29771 #

SIO-REF-74-33 ..... N75-29708 #

SIT-P278(6/73) ..... N75-29907*#

SLSR-7-75A ..... N75-29460 #
SLSR-12-75A ..... N75-29461 #
SLSR-14-75A ..... N75-29767 #
SLSR-16-75A ..... N75-29457 #
SLSR-17-75A ..... N75-29750 #
SLSR-18-75A ..... N75-29844 #
SLSR-19-75A ..... N75-29458 #
SLSR-20-75A ..... N75-29417 #
SLSR-21-75A ..... N75-29939 #
SLSR-24-75A ..... N75-29938 #
SLSR-30-75A ..... N75-29950 #
SLSR-31-75A ..... N75-29940 #

SPD-122-18 ..... N75-29711 #
SPD-601-01 ..... N75-29377 #

SR-1 ..... N75-29493 #
SR-2 ..... N75-29905 #
SR-3 ..... N75-29310 #
SR-4 ..... N75-29611 #
SR-17 ..... N75-29618 #
SR-18 ..... N75-29619 #
SR-19 ..... N75-29615 #
SR-20 ..... N75-29972 #

SRDE-74018 ..... N75-29301 #

SU-AIM-238 ..... N75-29811 #
SU-AIM-247 ..... N75-29809 #
SU-AIM-258 ..... N75-29799 #

SU-IPR-633 ..... N75-29969*#

SU-STAN-CS-74-437 ..... N75-29811 #
SU-STAN-CS-74-461 ..... N75-29809 #
SU-STAN-CS-75-476 ..... N75-29799 #

T-1039/4 ..... N75-29529*#

TACOM-TR-11933 ..... N75-29920 #
TACOM-TR-11960 ..... N75-29441 #

TAU-SOE-141/74 ..... N75-29493 #

TB-173 ..... N75-29302 #

TDCK-65318 ..... N75-29321 #
TDCK-65366-PT-5 ..... N75-29917 #
TDCK-65376 ..... N75-29688 #
TDCK-65441 ..... N75-29322 #
TDCK-65497-PT-3 ..... N75-29267 #
TDCK-65519-PT-1 ..... N75-29760 #
TDCK-65596 ..... N75-29323 #
TDCK-65599 ..... N75-29761 #
TDCK-65673-PT-1 ..... N75-29762 #
TDCK-65699-PT-2 ..... N75-29763 #
TDCK-65733 ..... N75-29744 #
TDCK-65789 ..... N75-29324 #

TI-ALEX(02)-TR-74-03-PT-A ..... N75-29622 #

TL-1974-20-PT-3 ..... N75-29267 #

TN-74-46-REV ..... N75-29958*#
TN-197 ..... N75-29030*#
TN-1975-3 ..... N75-29311 #
TN-1975-7 ..... N75-29946 #

TR-EE-75-17 ..... N75-29528*#

TR-EE74-38 ..... N75-29812 #

TR-M-5 ..... N75-29733 #

TR-2-57110/5R-3227 ..... N75-29356*#
TR-3 ..... N75-29341 #
TR-10 ..... N75-29709 #
TR-18 ..... N75-29345 #
TR-24 ..... N75-29226 #
TR-25 ..... N75-29265 #
TR-26 ..... N75-29919 #
TR-32 ..... N75-29712 #
TR-39 ..... N75-29257 #
TR-73-19 ..... N75-29613 #
TR-74-35 ..... N75-29259 #
TR-75-1 ..... N75-29521*#

TRB/TRR-515 ..... N75-29191 #

TRITA-EPP-74-08 ..... N75-29897 #
TRITA-EPP-74-24 ..... N75-29898 #
TRITA-EPP-74-25 ..... N75-29607 #
TRITA-EPP-75-01 ..... N75-29899 #

TROSCOM-TR-75-1 ..... N75-29948 #

TRW-ER-7603-F ..... N75-29441 #

TRW-20029-H017-R0-00 ..... N75-29166*#
TRW-22764-6004-RU-00 ..... N75-29612 #

TSC-PD-119-4 ..... N75-29306 #

TT-74-50028 ..... N75-29213 #
TT-74-53010 ..... N75-29144*#
TT-7409 ..... N75-29069 #
TT-7411 ..... N75-29759 #
TT-7413-PT-1 ..... N75-29480 #
TT-7413-PT-2 ..... N75-29481 #
TT-7501 ..... N75-29822 #

U-OF-IOWA-75-23 ..... N75-29604*#

UCLA-ENG-7486 ..... N75-29904 #

UILU-ENG-73-2025 ..... N75-29254 #
UILU-ENG-74-2006 ..... N75-29500 #

UILU-WRC-74-0091 ..... N75-29586 #

UIUC-CAC-DN-74-127 ..... N75-29269 #
UIUC-DCS-P-74-689 ..... N75-29330 #

UM-HSRI-BI-75-4 ..... N75-29747 #

UM-RSMAS-7 ..... N75-29734 #
UM-RSMAS-75006 ..... N75-29398 #
UM-RSMAS-75007 ..... N75-29713 #
UM-RSMAS-75009 ..... N75-29714 #
UM-RSMAS-75011 ..... N75-29710 #

UMICH-012449-5-T ..... N75-29378 #

UNC-SG-75-05 ..... N75-29540 #

US-PATENT-APPL-SN-430496 ..... N75-29236*
US-PATENT-APPL-SN-441279 ..... N75-29382*
US-PATENT-APPL-SN-453241 ..... N75-29318*
US-PATENT-APPL-SN-478802 ..... N75-29381*
US-PATENT-APPL-SN-521603 ..... N75-29380*
US-PATENT-APPL-SN-532784 ..... N75-29263*#
US-PATENT-APPL-SN-561020 ..... N75-29548*#
US-PATENT-APPL-SN-562992 ..... N75-29181*#
US-PATENT-APPL-SN-578240 ..... N75-29431*#
US-PATENT-APPL-SN-585988 ..... N75-29318*
US-PATENT-APPL-SN-596787 ..... N75-29430*#
US-PATENT-APPL-SN-596788 ..... N75-29320*#
US-PATENT-APPL-SN-598504 ..... N75-29432*#
US-PATENT-APPL-SN-598967 ..... N75-29277*#
US-PATENT-APPL-SN-599284 ..... N75-29383*#
US-PATENT-APPL-SN-602617 ..... N75-29160*#
US-PATENT-APPL-SN-602618 ..... N75-29547*#
US-PATENT-APPL-SN-773530 ..... N75-29192*
US-PATENT-APPL-SN-844243 ..... N75-29426*

US-PATENT-CLASS-23-254E N75-29380*
US-PATENT-CLASS-23-255E N75-29380*
US-PATENT-CLASS-73-23 ..... N75-29380*
US-PATENT-CLASS-73-117.4 ..... N75-29382*
US-PATENT-CLASS-73-178R N75-29381*
US-PATENT-CLASS-118-43 ..... N75-29192*
US-PATENT-CLASS-148-127 ..... N75-29236*
US-PATENT-CLASS-311-37 ..... N75-29380*
US-PATENT-CLASS-315-111 ..... N75-29318*
US-PATENT-CLASS-315-111 ..... N75-29426*
US-PATENT-CLASS-331-65 ..... N75-29380*

US-PATENT-3,004,189 ..... N75-29426*
US-PATENT-3,375,712 ..... N75-29382*
US-PATENT-3,390,023 ..... N75-29236*
US-PATENT-3,469,103 ..... N75-29318*
US-PATENT-3,603,285 ..... N75-29192*
US-PATENT-3,895,521 ..... N75-29381*
US-PATENT-3,895,912 ..... N75-29380*

USA-WLABS-TR-75-10-AMEL ..... N75-29057 #

USAAMRDL-TR-74-86 ..... N75-29097 #
USAAMRDL-TR-74-94 ..... N75-29123 #
USAAMRDL-TR-74-100 ..... N75-29459 #
USAAMRDL-TR-74-101 ..... N75-29462 #

USAARL-75-9 ..... N75-29749 #

USAAVSCOM-TR-74-53 ..... N75-29100 #
USAAVSCOM-TR-74-58 ..... N75-29098 #

USACAA-D-74-11-VOL-1 ..... N75-29806 #
USACAA-D-74-11-VOL-2 ..... N75-29807 #
USACAA-D-74-11-VOL-3 ..... N75-29808 #

USAMC-ITC-02-08-73-201 ..... N75-29456 #

UTIAS-195 ..... N75-29863 #

VKI-TN-103 ..... N75-29044 #
VKI-TN-104 ..... N75-29045 #

VTH-180 ..... N75-29489 #
VTH-183 ..... N75-29369 #
VTH-184 ..... N75-29368 #
VTH-186 ..... N75-29370 #
VTH-189 ..... N75-29055 #

WHOI-75-14 ..... N75-29706*#

WHO-299 ..... N75-29574 #

WHSI-WORKING-PAPER-226 ..... N75-29796 #

WORKING-PAPER-101-16 ..... N75-29752 #

WTHD-71 ..... N75-29366 #
WTHD-72 ..... N75-29478 #

WVT-7135 ..... N75-29491 #

W75-04933 ..... N75-29586 #
W75-06083 ..... N75-29542 #
W75-06520 ..... N75-29544 #

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley

COLORADO
University of Colorado, Boulder

DISTRICT OF COLUMBIA
Library of Congress

GEORGIA
Georgia Institute of Technology, Atlanta

ILLINOIS
The John Crerar Library, Chicago

MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge

MISSOURI
Linda Hall Library, Kansas City

NEW YORK
Columbia University, New York

OKLAHOMA
University of Oklahoma, Bizzell Library

PENNSYLVANIA
Carnegie Library of Pittsburgh

WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an "*" following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library

COLORADO
Denver Public Library

CONNECTICUT
Hartford Public Library

MARYLAND
Enoch Pratt Free Library, Baltimore

MASSACHUSETTS
Boston Public Library

MICHIGAN
Detroit Public Library

MINNESOTA
Minneapolis Public Library

MISSOURI
Kansas City Public Library
St. Louis Public Library

NEW JERSEY
Trenton Public Library

NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library

OHIO
Akron Public Library
Cincinnati Public Library
Cleveland Public Library
Dayton Public Library
Toledo Public Library

TENNESSEE
Memphis Public Library

TEXAS
Dallas Public Library
Fort Worth Public Library

WASHINGTON
Seattle Public Library

WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 750 Third Avenue, New York, New York 10017.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols "#" and "*", from: ESA - Space Documentation Service, European Space Agency, 114 Avenue Charles-de-Gaulle, 92522 Neuilly-sur-Seine, France.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

SPECIAL FOURTH CLASS MAIL
Book

POSTAGE AND FEES PAID
NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION
NASA-451

U.S.MAIL

POSTMASTER : If Undeliverable (Section
Postal Manual) Do Not R

U.S.MAIL